

KEDJONA MINING AND EXPLORATION (PTY) LTD

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL
MANAGEMENT PROGRAMME REPORT FOR A MINING RIGHT
APPLICATIONS FOR IRON ORE (FE), TITANIUM (TI), VANADIUM (V),
CHROME (CR), COPPER (CU), NICKEL (NI), COBALT (CO), GOLD (AU)
AND PLATINUM GROUP METALS (PGM), AT VARIOUS PORTIONS OF
FARM LEEUWKILP 363 JS (EXCLUDING PORTIONS 5 AND 8 OF THE
FARM), AND THE FARM GOEDVERWACHT 354 JS, MPUMALANGA
PROVINCE**

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DRAFT ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR A MINING RIGHT APPLICATIONS FOR IRON ORE (FE), TITANIUM (TI), VANADIUM (V), CHROME (CR), COPPER (CU), NICKEL (NI), COBALT (CO), GOLD (AU) AND PLATINUM GROUP METALS (PGM), AT VARIOUS PORTIONS OF FARM LEEUWKILP 363 JS (EXCLUDING PORTIONS 5 AND 8 OF THE FARM), AND THE FARM GOEDVERWACHT 354 JS, MPUMALANGA PROVINCE

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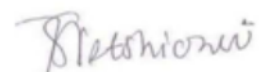
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1 EXECUTIVE SUMMARY

1.1 Introduction

Kedjona Mining and Exploration (Pty) Ltd formerly known as Middelburg Bricks (Pty) Ltd is a South African company with intentions of identifying small, medium and large reserves and resources in order to develop them into a minable profit while creating employment and unlocking the earth's wealth in the future. The minable developments can be both nationally and internationally.

Kedjona Mining and Exploration (Pty) Ltd was granted a prospecting right (16 January 2009) of base metals in the Mpumalanga province. The granted right was over Leeuwklip 363 JS (all portions excluding 5 & 8) and Goedverwacht 354 JS totalling an aerial extent of 4 188.1577 Hectares. A total of 9 minerals were granted namely: Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM).

As per legislative requirements, an Environmental Authorisation (EA) Application in terms of the National Environmental Management Act, 1998 (NEMA, Act No. 107 of 1998), Mining Right (MR) Application in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA, Act No. 28 of 2002) as amended, Waste Management Licence (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) must be submitted simultaneously with the Department of Mineral Resources and Energy (DMRE), and Water Use Licence Application (WULA) in terms of the National Water Act, 1998 (Act 36 of 1998) (NWA), will be submitted to the Department of Water and Sanitation (DWS). Kedjona Mining lodged an application for a MR, EA and WML to DMRE on 21 May 2021 and was accepted on 01 December 2021. A separate process for WULA will be conducted with DWS.

The project triggers activities listed in terms of Listing Notices 1 (Activities 12, 25, 27, and 56), Listing Notice 2 (Activities 6, 15, 17 and 16) and Listing Notice 3 (Activities 4, 10, 12 and 18) of the NEMA (as amended).

The proposed processing plant, stockpile and dump areas of hard and soft material will trigger activities listed in GNR 921 (Category B: Activities 7, 8, and 10) of the NEM: WA and therefore requires a WML from the DMRE. A full Environmental Impact Assessment (EIA) including Scoping

and Impact Assessment was followed as stipulated in GNR 982 of the NEMA and GNR921 of the NEM: WA.

The proposed mine also requires a WUL for water uses as defined in Section 21 of the National Water Act, 1998 (Act 36 of 1998) (NWA). The proposed water uses to be applied for include Section 21 a, b, g and j.

The Mining Right area is located on various portions of farm Leeuwkulp 363 JS (excluding portions 5 and 8 of the farm), and the farm Goedverwacht 354 JS in the Jurisdiction of Emakhazeni Local Municipality in the Nkangala District Municipality in Mpumalanga Province. The footprint of the proposed project is approximately 4188.1577ha and is located 45km northeast of Middleburg town and 15km north-west of Belfast town. It is enveloped by the N4, 20km on the south, R33 on the east and 5km away on the west by the R55 road.

1.1.1 Who is conducting the EIA?

Kimopax (Pty) Ltd (“Kimopax”) has been appointed as an Independent Environmental Assessment Practitioner (EAP), to undertake the Mining Right Application with the associated applications for an EA, WML & WULA for the proposed Project. The reports and documentation for the integrated EA/WML application process will be compiled and finalised for submission to the DMRE for the EA/WML in terms of the NEMA for consideration and decision making. The DMRE will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

1.1.2 Who will evaluate the EIA?

Before the proposed development can proceed, approval must be obtained from the regulatory authorities. The EIA Report will be submitted to the DMRE for review. The competent authorities will then advise the project team as to how the project should proceed for the impact assessment Phase of the project. The impact assessment phase will entail detailed specialist investigations, reporting and further stakeholder involvement. Only once a Final Environmental Impact Assessment Report (EIAR) and EMPr have been submitted to DMRE can a decision be taken by the Department as to whether the project may proceed or not.

1.2 Description of the Proposed Development

The mine will be developed as follows:

- All mining blocks will be mined by means of conventional open pit mining method. Mining will be at an average stripping ratio of 3: 1. Topsoil and overburden from the initial mining block will be stockpiled;
- Opencast mining will take place through series of drill and blast, supported by conventional truck and shovel operation, assisted by roll-over dozing, to allow for continuous backfilling and rehabilitation of the mined out area; and
- Three proposed waste dump sites, one each for topsoil, soft waste material and hard waste material, will be utilised to minimise the hauling of overburden material over excessive distances.

The infrastructures that will be required are the following:

- Processing Plant;
- Stormwater management infrastructure;
- A pollution control dam;
- Buildings including workshops, change house-lamp room, offices, stores;
- Contractors' laydown area and parking;
- Access roads which will be constructed, running to the mine and open cast area;
- Power Supply infrastructure including a switching yard and electrical powerlines;
- Sewerage treatment package plant;
- Water Treatment Plant;
- Fuel storage; and
- Water Infrastructures including portable water tanker etc.

The Life of Mine (LOM) for Kedjona Mining is approximately 35 years.

The potential environmental impacts associated with the mining activities will be identified through the EIA Report of the EIA Study, assessed and significance of impacts determined through the Environmental Impact Report (EIR) and managed through a detailed Environmental Management Programme (EMPr).

The draft Scoping Report, draft EIR and EMPr will be available for public review for 30 days, and details thereof will be communicated to I&APs.

1.2.1 Environmental Impact Assessment Process

An EIA seeks to identify the environmental consequences of a proposed project from the beginning, and helps to ensure that the project, over its life cycle, will be environmentally acceptable, and integrated into the surrounding environment in a sustainable way. The project triggers activities listed in GNR984 (Listing Notice 2) of the NEMA and requires that a full EIA (scoping and impact assessment phases) be conducted. Two parallel processes are followed during the scoping Phase being the Environmental technical process and Stakeholder engagement process.

1.2.2 Stakeholder Engagement Process

Activities that have been undertaken for the public involvement process during the scoping Phase are:

- a) Development of a stakeholder database:
 - o The stakeholder database comprises a variety of stakeholders identified from the previous mining right application projects in the area, newly identified stakeholders through the registering process of this project.

The opportunity to participate in the EIA and to register as an Interested and Affected Party (I&AP) was announced in June 2021 through the following means:

- b) Advert was placed in the Middelburg Observer newspaper;
- c) Letter of invitations to register and background information documents;
- d) Placing of Site notices were erected at several places in and around the proposed study area;
- e) Collation of comments received into a Comments and Responses Register (CRR); and
- f) Obtaining and documenting registration and comment sheets.

The Draft Scoping Report was made available for a 30-day commenting period. All issues, comments and suggestions received from stakeholders will be reviewed and collated into a CRR. Where necessary, comments from stakeholders will also be incorporated into the Final Scoping Report that will be submitted to the DMRE for decision-making. A public meeting was held during the Scoping Phase of the project.

The EIA/ EMPr Report is available to the stakeholders for a 30-day review and comment period. A public meeting to discuss the findings from the specialist studies and impact assessment phase will be held. Comments received will be incorporated into the Final EIA/EMPr Report which will be submitted to the DMRE for decision making. The comments will also be collated into the CRR, which will form an Appendix to the EIA/EMPr Report.

The stakeholders will be notified of the Department final decision on the project once it has been communicated to the EAP and applicant.

1.2.3 Profile of the receiving environment

The scoping report provides a general description of the status quo of the receiving environment in the project area. It serves to set the scene and provide context to the area within which the scoping exercise was conducted. This section also includes the main issues/impacts associated with each aspect and how the proposed project will affect the biophysical and social environment.

1.2.4 Anticipated Impacts

Risks and potential impacts will be categorised according to the type of activity undertaken and the relation to each environmental variable. Findings from specialist studies will be incorporated into the EIA/EMPr Report. The following impacts as described below are anticipated because of the construction, operation and decommissioning Phases of the project:

- a) Possible job opportunities during the construction and operation.
- b) Changes in the topography in the area.
- c) Possible groundwater and surface water contamination.
- d) Possible impact on Air Quality in the area.
- e) Possible impacts on private properties and fauna due to blasting and vibrations.
- f) Possible contribution to climate change through emission of Green House Gases.
- g) Possible generation of noise during construction and operation.

- h) Visual impact associated with the mine infrastructure and operation.
- i) Loss of soil resource and change in land capability and land use.
- j) Disturbance and loss of biodiversity.
- k) Possible impact on heritage and cultural resources (including graves) in the area.
- l) Potential safety issues due to the increased traffic.

1.2.5 Specialist Studies

The following specialist inputs are expected to be required for the proposed Mine:

- a) Groundwater impact assessment;
- b) Surface water assessment;
- c) Heritage resources;
- d) Air Quality assessment;
- e) Biodiversity (Flora and Fauna);
- f) Soils, Land Use and Land Capability assessment;
- g) Rehabilitation and Closure Costing;
- h) Socio-economic assessment;
- i) Traffic Impact Assessment;
- j) Visual assessment;
- k) Noise assessment; and
- l) Blasting and vibration assessments.

All specialists will assess the impact (including cumulative) of each proposed activity/aspect in relation to the construction, operational, closure and decommissioning phases and develop appropriate mitigation measures that can be implemented to reduce or eliminate the potential impacts identified.

1.2.6 Quantification of Impacts

The anticipated impacts associated with the proposed project will be assessed according to Kimopax standardized impact assessment methodology which is presented in Section 11. This methodology has been utilized for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an

impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

1.3 Plan of Study for the EIA

The Scoping Report is concluded with a Plan of Study for the EIA which explains how the EIA will be conducted for the project in accordance with the following:

- a) Key environmental issues identified during the scoping phase to be investigated further in the EIA phase;
- b) Feasible alternatives to be assessed further in the EIA phase;
- c) Development of a Waste Management Plan as part of the EMPr;
- d) Specialist investigations which need to be finalized;
- e) The public participation process to be followed;
- f) Contents of the EIA/EMPr Report; and
- g) Consultation with the authorities.

1.4 Conclusion and Recommendation

The Scoping Report has presented:

- a) The environmental process undertaken so far;
- b) A brief description of the proposed project;
- c) A baseline description of the current environment;
- d) The potential environmental and social impacts identified to date; and
- e) The recommended environmental process to be followed to develop the EIA/EMPr Report.

A comprehensive public involvement process will be implemented during scoping. The EIA process is however, iterative and therefore additional potential issues/impacts and alternatives

may be identified during the impact assessment phase that may require further investigation/consideration.

It is anticipated that implementation of the Plan of Study (PoS) presented in this report will result in an adequate EIA process which will result in the formulation of a sound EMPr to be implemented throughout the LOM.

The process followed during the detailed impact assessment phase will meet the requirements of the legislation to ensure that the regulatory authorities receive enough information to enable informed decision-making.

2 LIST OF ABBREVIATIONS

ABET:	Adult Basic Education and Training
BID:	Background Information Document
BoD:	Board of Directors
CA:	Competent Authority
CBAs:	Critical Biodiversity Areas
CPR:	Competent Persons Report
CRR:	Comments and Responses Register
DAFF:	Department of Agriculture, Forestry and Fisheries
DEA:	Department of Environmental Affairs
DEIAR:	Draft Environmental Impact Assessment Report
DEMP:	Draft Environmental Management Programme
DMRE:	Department of Mineral Resources and Energy
DMS:	Dense Media Separation
DSR:	Draft Scoping Report
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
ECO:	Environmental Control Officer (ECO)
EAP:	Environmental Assessment Practitioner
EC:	Electrical Conductivity
EIA:	Environmental Impact Assessment

EIAR:	Environmental Impact Assessment Report
EMPR:	Environmental Management Programme
EIS:	Ecological Importance Status
ESAs:	Ecological Support Areas
EWV:	Ecological Water Requirements
FEL:	Front End Loader
FOB:	Free On Board
GDP:	Gross Domestic Product
GG:	Government Gazette
GNR:	Government Notice Regulation
GVA:	Gross Value Added
HDPE:	High-Density Polyethylene-Lined
HIA:	Heritage Impact Assessment
HRDP:	Human Development Resources Plan
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plan
IEM:	Integrated Environmental Management
IHI:	Index for Habitat Integrity
IWUL:	Integrated Water Use Licence
LED:	Local Economic Development
MHSA:	Mine Health and Safety Act (Act No. 29 of 1996)

MPRDA:	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
MQA:	Mining Qualifications Authority
MRA:	Mining Right Application
NEMA:	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMBA:	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEMWA:	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NFEPAs:	National Freshwater Ecosystem Priority Areas
NHRA:	National Heritage Resources (Act No. 25 of 1999)
NPV:	Net Present Value
NWA:	National Water Act, 1998 (Act 36 of 1998)
PPP:	Public Participation Process
PAIA:	Promotion of Access to Information Act (Act No. 2 of 2000)
PCD:	Pollution Control Dam
PES:	Present Ecological Status
PFC:	Power Factor Correction
POIs:	Points of Interest
PoS	Plan of Study
QDS:	Quarter Degree Square
RD:	Relative Density

ROM:	Run of Mine
SACNASP:	South African Council for Natural Scientific Profession
SAHRA:	South African Heritage Resource Agency
SAHRIS:	South African Heritage Resources Information System
S&EIR:	Scoping and Environmental Impact Reporting (S&EIR)
SAMREC:	South African Code for the Reporting of Exploration Results
SANBI:	South African National Biodiversity Institute
SANS:	South African National Standards
SARHP:	South African River Health Programme
SCC:	Species of Conservation Concern
SDP:	Skills Development Plan
SETA:	Sector Education and Training Authority
SR:	Scoping Report
TDS:	Total Dissolved Solids
VEGRAI:	Vegetation Response Assessment Index
WARMS:	Water Registration and Management Systems
WML:	Waste Management Licence
WMS:	Hydro Water Management system

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESMENT AND ENVIRONMENTAL MANAGEMENT REPORT

**FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK
SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF IRON ORE (FE),
TITANIUM (TI), VANADIUM (V), CHROME (CR), COPPER (CU), NICKEL (NI), COBALT
(CO), GOLD (AU) AND PLATINUM GROUP METALS (PGM).**

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).

NAME OF APPLICANT: KEDJONA MINING AND EXPLORATION (PTY) LTD

TEL NO: 012 345 3385

FAX NO: 086 517 6603

POSTAL ADDRESS: P.O Box 5425, Halfway House, Midrand, Gauteng

PHYSICAL ADDRESS: 8 Kyalami Estate, Robin Street, Kyalami, Gauteng

FILE REFERENCE NUMBER SAMRAD: MP30/5/1/2/2/10352MR

4 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 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.

5 OBJECTIVE OF THE SCOPING PROCESS

- 1) The objective of the scoping process is to, through a consultative process—
 - (a) identify the relevant policies and legislation relevant to the activity;
 - (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
 - (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
 - (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
 - (e) identify the key issues to be addressed in the assessment phase;
 - (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
 - (g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

6 ENVIRONMENTAL IMPACT ASSESSMENT REPORT

6.1 . Contact Person and Correspondence Address

6.1.1 Details of the EAP who prepared the report

The EAPs involved in the compilation of this EIA Report and their contact details are provided in Table 1 below.

Table 1: EAP Contact Details

Name of The Practitioner	Tel No	Fax No	E-mail address
Lufuno Nengwani	082 832 9378	011 312 9768	Lufuno@kimopax.com
Charles Chigurah	071 887 1394	011 312 9768	Charles@kimopax.com
Simon Netshiozwi	082 095 8830	011 312 9768	simon@kimopax.com

6.1.2 Expertise of the EAP.

i. The qualifications of the EAP

(With evidence attached as Appendix 1).

- Diploma in Mining Engineering.
- BSc (Hons) Mining and Environmental Geology.

Completed the various Environmental Management modules such as Ecological Principles for Environmental Management, The Natural Environment as a System, Pollution and Environmental Quality; Environmental Geology and Mine Rehabilitation; Environmental Impact Assessment and Modelling; Resource Evaluation and Information System; GIS and Map Production; and Advanced Mining and Environmental Management

ii. Summary of the EAP's past experience.

(Attach the EAP's curriculum vitae as Appendix 2)

Mr Nengwani has over 6 years of working experience in the environmental management field obtained from Geoluken Consulting, Crysbol, and Multiview Investments which are an environmental consulting companies. My expertise is ranging from conducting applications for Environmental Authorisations (mining and developmental projects), Water Use License applications, Waste Management Applications, performance assessment reports for operational mines, and water sampling. Supervisory duties within the field, Environmental reports, progress report writing and proposals, including Environmental Management Plans/Programmes, handling of the Department of Mineral Resources (DMR) documents in general.

6.2 Details of the Applicant

Table 2: Details of Applicant

Project applicant:	Kedjona Mining and Exploration (Pty) Ltd		
Registration no (if any):	2006/007599/07		
Trading name (if any):	Kedjona Mining and Exploration (Pty) Ltd		
Responsible Person (e.g. Director, CEO, etc):	Ying Chang (Director)		
Contact person:	Ying Chang		
Physical address:	8 Kyalami Estate, Robin Street, Kyalami, Gauteng		
Postal address:	P.O Box 5425, Halfway House, Midrand, Gauteng		
Postal code:	1685	Cell:	082469-8642
Telephone:	012 345 3385	Fax:	0865176603
E-mail:	muraga@tsimbi.com		

6.3 Description of the property

Table 3: Location details

Farm Name:	Leeuwklip 363 JS (excluding portions 5 and 8 of the farm) and the farm Goedverwacht 354 JS
Application area (Ha)	4188.1577 ha
Magisterial district:	Middelburg
Distance and direction from nearest town	45km north east of Middleburg town and 15km north-west of Belfast town. It is enveloped by the N4, 20km on the south, R33 on the east and 5km away on the west by the R55 road.
21 digit Surveyor General Code for each farm portion	Leeuwklip 363- T0JS00000000036300000 Goedverwacht 354- T0JS00000000035400000

6.4 Locality map

(show nearest town, scale not smaller than 1:250000 attached as Appendix 3).

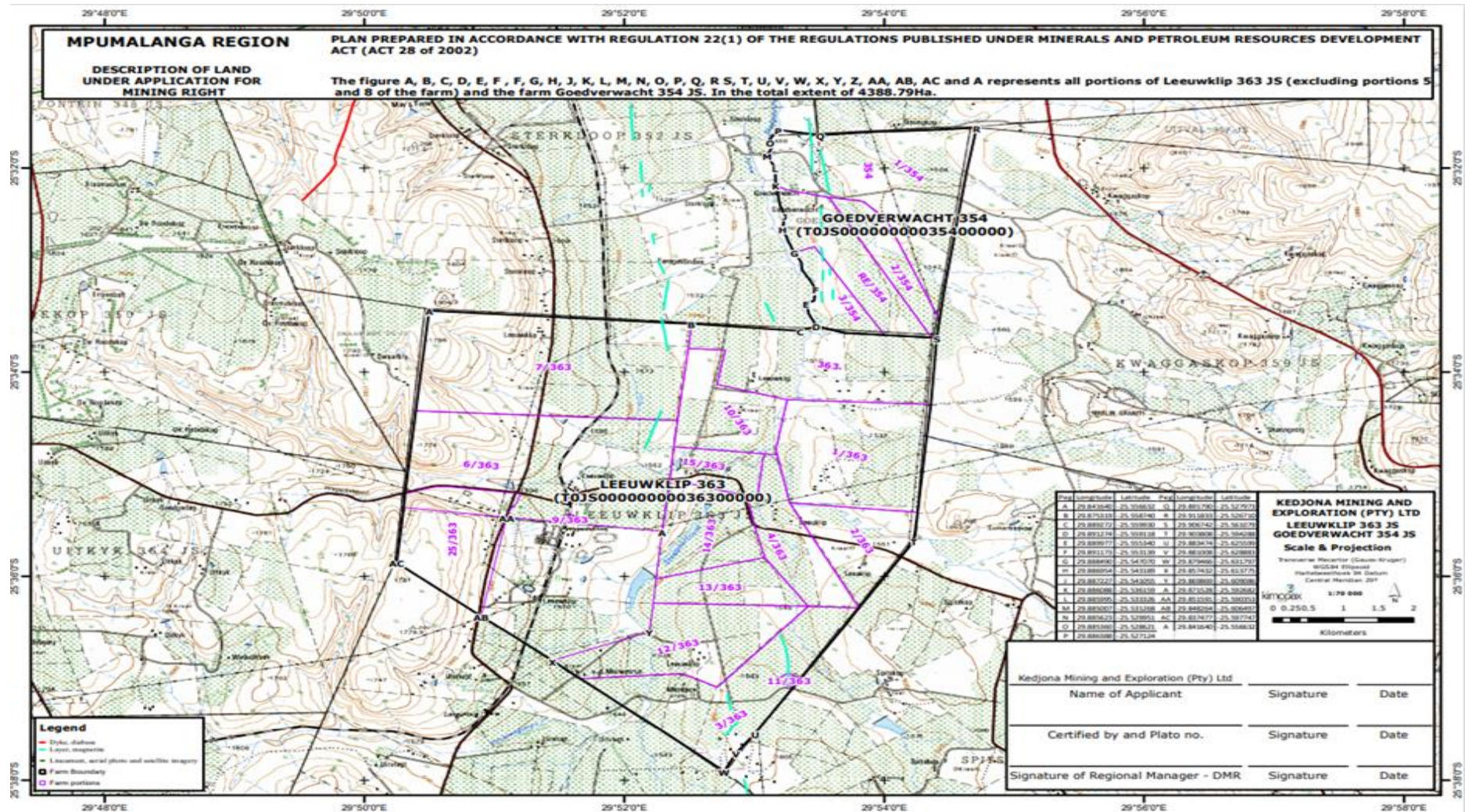


Figure 1: Locality Map of the area



Figure 2: Map of the area in Mpumalanga



Figure 3: Project location with regards to various towns

6.5 Description of the scope of the proposed overall activity.

6.5.1 Listed and specified activities

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1:10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix 4.

Table 4: Listed activities applied

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc. E.g. For mining, - excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	AERIAL EXTENT OF THE ACTIVITY (HA OR M ²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE <i>GNR 983, GNR 984 or GNR 985</i>	WASTE MANAGEMENT AUTHORIZATION Indicate whether an authorisation is required in terms of the Waste Management Act Mark with an X where applicable
[Mining Right Application]	4 188.1577 ha	<input checked="" type="checkbox"/>	[GNR 984 Activity 17	<input type="checkbox"/>
[Open cast pit]	30 ha	<input checked="" type="checkbox"/>	[GN R 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>
[Vegetation clearance	420 ha	<input checked="" type="checkbox"/>	[GN R 983 Activity 27 GN R 984 Activity 15 GNR 985 Activity 12	<input type="checkbox"/>
[Excavations	420 ha	<input checked="" type="checkbox"/>	[GNR 984 Activity 15 GNR 985 Activity 12	<input type="checkbox"/>
[Trenches	1 ha	<input checked="" type="checkbox"/>	[GNR 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>
[Processing plant	1 ha	<input checked="" type="checkbox"/>	[GNR 984 Activity 17	<input checked="" type="checkbox"/>

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route etc. E.g. For mining , - excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	AERIAL EXTENT OF THE ACTIVITY (HA OR M²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE <i>GNR 983, GNR 984 or GNR 985</i>	WASTE MANAGEMENT AUTHORIZATION Indicate whether an authorisation is required in terms of the Waste Management Act Mark with an X where applicable
			GNR 921 Category B Activity 10	
Fuel Storage	500m ³	<input checked="" type="checkbox"/>	GNR 983 Activity 14 GNR 985 Activity 10	<input type="checkbox"/>
Access roads	12 ha	<input checked="" type="checkbox"/>	GNR 983 Activity 27 GNR 983 Activity 56 GNR 985 Activity 4 GNR 985 Activity 12 GNR 985 Activity 18	<input type="checkbox"/>
Waste Dump Areas (softs, overburden and hards)	60 ha	<input checked="" type="checkbox"/>	GNR 984 Activity 15 GNR 985 Activity 12 GNR 921 Category A Activity 10 GNR 921 Category A Activity 12	<input checked="" type="checkbox"/>
Offices, Workshops and Change Houses	0.18 ha	<input checked="" type="checkbox"/>	GNR 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>
Ablution	<1 ha	<input checked="" type="checkbox"/>	GNR 985 Activity 12	<input type="checkbox"/>
Sewerage treatment package plant	<1 ha	<input checked="" type="checkbox"/>	GN R 983 Activity 25 GN R 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>
Water Treatment Plant	<1 ha	<input checked="" type="checkbox"/>	GN R 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>
Contractors laydown area	0.5 ha	<input checked="" type="checkbox"/>	GNR 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc. E.g. For mining -excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.	AERIAL EXTENT OF THE ACTIVITY (HA OR M²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE <i>GNR 983, GNR 984 or GNR 985</i>	WASTE MANAGEMENT AUTHORIZATION Indicate whether an authorisation is required in terms of the Waste Management Act Mark with an X where applicable
Stockpiles	5 ha	<input checked="" type="checkbox"/>	GNR 921 Category B Activity 10	<input checked="" type="checkbox"/>
Pollution Control Dam	2 ha	<input checked="" type="checkbox"/>	GNR 983 Activity 12 GNR 984 Activity 6 GNR 984 Activity 16 GNR 985 Activity 12 GNR 921 Category B Activity 10	<input checked="" type="checkbox"/>
Conveyer	5 ha	<input checked="" type="checkbox"/>	GN R 983 Activity 27	<input type="checkbox"/>
Blasting		<input type="checkbox"/>	Not Listed	<input type="checkbox"/>
Rehabilitation		<input type="checkbox"/>	Not Listed	<input type="checkbox"/>
Dust Suppression		<input type="checkbox"/>	Not Listed	<input type="checkbox"/>
Fencing	20 ha	<input checked="" type="checkbox"/>	GN R 983 Activity 27 GNR 985 Activity 12	<input type="checkbox"/>

6.5.2 Description of the activities to be undertaken

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

6.5.2.1 Opencast mining

Where orebodies lie close to the surface, they would be accessed by open cut mining, involving a pit and the removal of much overburden (overlying rock) as well as a lot of waste rock (Roll over mining). Where orebodies are deeper, underground mining would be employed, involving construction of access shafts and tunnels but with less waste rock removed and less environmental impact.

The mine will be developed as follows:

- All mining blocks will be mined by means of conventional open pit mining method. Mining will be at an average stripping ratio of 3: 1. Topsoil and overburden from the initial mining block will be stockpiled;
- Opencast mining will take place through series of drill and blast, supported by conventional truck and shovel operation, assisted by roll-over dozing, to allow for continuous backfilling and rehabilitation of the mined-out area; and
- Three proposed waste dump sites, one each for topsoil, soft waste material and hard waste material, will be utilised in order to minimise the hauling of overburden material over excessive distances.

6.5.2.1.2 Infrastructure Required

The proposed infrastructure includes:

- Processing Plant;
- Stormwater management infrastructure;
- A pollution control dam;
- Buildings including workshops, change house-lamp room, offices, stores;
- Contractors' laydown area and parking;
- Access roads which will be constructed, running to the mine and open cast area;
- Power Supply infrastructure including a switching yard and electrical powerlines;
- Sewerage treatment package plant;
- Water Treatment Plant;
- Fuel storage; and
- Water Infrastructures including portable water tanker etc.

6.6 Policy and Legislative Context

Table 5: Policy and Legislative Context of proposed project

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
The Constitution of South Africa (No. 108 of 1996)	<p>Chapter 2 – bill of rights</p> <p>Section 24 – Environmental Rights</p> <p>The proposed activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental rights of South Africans.</p>
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended	<p>Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment)</p> <p>Section 28 – Duty of care and remediation of environmental damage</p> <p>Environmental management principles will be incorporated into the EIA and EMPr, which the applicant will be required to comply with to ensure that negative impacts on the environment are avoided or kept to a minimum and that positive impacts are enhanced.</p>
The Environmental Impact Assessment Regulations of 2014 (Government Notice (GN) 984), as amended	The EIA Regulations (GNR 982) were promulgated in terms of Sections 24 of the NEMA, to manage the process, methodologies and requirements for the undertaking of an EIA. The GNR 982 stipulates that the applicant for activities listed under GNR 983, 984 or 985 must appoint an independent EAP to manage the EIA process. Listed

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
	<p>Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental impact on the environment, and which may not commence without an EA from the Competent Authority (CA). EA required for Listed Activities is subject to the completion of either a Basic Assessment (BA) process or full Scoping and Environmental Impact Assessment (S&EIA) with applicable timeframes associated with each process. The EA must be obtained prior to the commencement of those listed activities.</p> <p>The project triggers activities listed in GNR 983, 984 and GNR 985 and will require an EA from the DMRE. According to GNR 982 of the NEMA, activities listed in GNR 984 require that a full S&EIA be undertaken. The applicable listed activities that will be triggered by the project is provided in Table 4 above.</p>
National Water Act, 1998 (Act No. 36 of 1998) (NWA)	<p>The project will require a Section 21 (a, b, g and j) IWUL</p> <p>Section 21 (a): Taking water from a water resource: Groundwater will be required for the project (potable and industrial use).</p> <p>Section 21 (b): Storing of water: Water containing waste will be stored on a PCD.</p> <p>21(g): Disposing of waste in a manner which may detrimentally impact on a water resource: Due to the proposed mining activities, dust suppression activities will be undertaken using process water.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
	<p>The project also includes Pollution Control Dams which constitute a Section 21 (g) water use.</p> <p>21(j): Removing, discharging, or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people: For the removal of rainfall and groundwater ingress into the pits for safety reasons.</p>
<p>Minerals and Petroleum Resources Development Act (No. 28 of 2002)</p>	<p>The Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) makes provision for equitable access to and sustainable development of South Africa's mineral resources. The MPRDA requires that the environmental management principles set out in NEMA shall apply to all mining operations and serves as a guideline for the interpretation, administration and implementation of the environmental requirements of NEMA.</p> <p>The MPRDA requires that a reconnaissance permission, prospecting right, mining right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right, production right, prospecting work programme, exploration work programme, production work programme, mining work programme environmental management programme or an environmental authorisation issued in terms of the National Environmental Management Act, 1998, as the case may be, may not be amended or varied (including by extension of the area covered by it or by the additional of minerals or a shares or seams, mineralised bodies or</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
	<p>strata, which are not at the time the subject thereof) without the written consent of the Minister.</p> <p>The proposed mining project requires an Environmental Authorisation from DMRE.</p>
National Environmental Management: Waste Act, 2008 (Act 59 of 2008)(NEMWA)	<p>It is expected that activities listed in GNR921 (Category B) will be triggered by the proposed project and will require a waste management licence.</p>
National Environmental Management Biodiversity Act (No. 10 of 2004)	<p>The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The Act provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable or protected.</p> <p>During the EIA process, biodiversity hotspots and bioregions will be investigated to determine the potential impacts that the project may have on the receiving environment. The management and control of alien invasive species on the impacted areas during all the phases of the project will be governed by the NEM: BA. The NEM: BA ensures that provision is made by the site developer to remove any alien species, which have been introduced to the site or are present on the site.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
National Heritage Resources Act (No. 25 of 1999)	Heritage Permit for structures 60 years or older. A Phase 1 Heritage assessment will be conducted for the proposed project to identify heritage and/or cultural sites affected by the mining infrastructure and activities, if any.
National Environmental Management: Air Quality Act, Act 39 of 2004, National Dust Control Regulations (GN 827)	Air quality management Section 32 – Dust control. Section 34 – Noise control. Section 35 – Control of offensive odours. An Air Quality assessment will be conducted as part of the EIA, which will determine the requirement for an Air Emissions Licence (AEL). The principles of the NEM: AQA, focusing on minimisation of pollutant emissions will also be taken cognisance of in the development of the EMPr.
Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended in 2014	Land Claims There are no land claims associated with the proposed property where mining will take place.
Municipal Plans and Policies	
Nkangala District Municipality and Emakhazeni Local Municipality IDP	The Integrated Development Plan (IDP) was used to identify relevant socio-economic background information as well as spatial development information. It is expected that Kedjona Mine will contribute significantly to the local, regional, and national

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED
	economy. The extent to which the project will contribute to the economy will be assessed during the impact assessment phase of the project.

6.7 Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

The mining project forms part of a larger scheme for the alleviation of poverty within the local municipality, which will not only improve the living standards for several previously disadvantaged communities, but also potentially allow for the future development of this area.

The project will provide positive impacts in the form of employment opportunities and skills development, skills transfer and ultimately resulting to Gross Domestic Product (GDP) growth, therefore eradicating poverty in such a case stimulating Local Economic Development. Not only that, but the business opportunities will also be encouraged through infrastructural development such as roads which will be constructed and improved to access the mining area, this will assist in increasing the demand for goods and services in the affected area/s in a long term. According to the Municipality IDP, there is a need for Local Economic Development, with unemployment as the main concern highlighted within the local Municipality. In the strive to poverty alleviation, the municipality greatly consider employment generation as a required tool and might be achieved through developments like the proposed mining project.

Since the local labour from adjacent farm communities such as Middleburg, Belfast and Emalahleni will be employed by the mine. This will have a positive impact on the wellbeing of employees with a multiplier effect on households of the employed. Moreover, the development will encourage development of Black Economic Empowerment (BEE) opportunities during construction, operation and eventual closure and rehabilitation.

Opportunities that exist within mining are as follows:

- a) Constant demand on the market for commodities;

-
- b) Establishment of a permanent working group between the Municipality and the mine managers responsible from developing local economic development initiatives;
 - c) Encourage local SMME's and entrepreneurs to take advantage of procurement;
 - d) Develop a database of available labour and skills to encourage the employment of local people;
 - e) Provide skills training and support programmes; and
 - f) Instigate mining procurement opportunities in consultation with the mines, develop a database of such opportunities and ensure that this information is made available to local businesses and communities.

6.8 Period for which the environmental authorisation is required

The EA/WML will be required for a period of 34 years.

6.9 Description of the process followed to reach the proposed preferred site.

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

6.10 Details of all alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

6.10.1 the property on which or location where it is proposed to undertake the activity;

The location of the proposed project components is constrained to the location of the existing mineral resource. As such, no property alternatives were considered for the location of the underground mining area and open cast pit area.

6.10.2 the type of activity to be undertaken;

The proposed and preferred option to mine the minerals applied for is thus far, the most preferred activity owing to the presence of these minerals within the proposed site. The mining opportunity will by far economically and socially empower and uplift the local communities. The land is presently utilised for agricultural purpose including grazing activities.

Furthermore, opencast mining method is the preferred option in comparison to underground mining. This is due to the shallow nature of Iron Ore, Vanadium and Titanium deposit that can easily be mined by means of opencast mining. Underground mining has a greater safety risk to the miners as compared to the open cast mining method. Underground mining method may be considered in future when the commodity priced get favourable and near surface resources are depleted.

6.10.3 the design or layout of the activity;

The design or layout of the activity entails the consideration of the different options to place project mine. The site was selected based on the geographic location of the potentially underling required mineral reserves. The layout of the site was however selected based on considerations made for the surrounding environment where possible, ease of operations and mining activities on site as well as minimal disturbance to the community near the site. The site/land area for run of activity was selected based on the size (according to the geology of the area), and position and of the mineral reserves to be exploited. The preferred layout was more considered more importantly owing to the availability of Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM) minerals, the land ownership, the geo-hydrological impacts and the ease and available transport modes and routes therefore the proposed layout is therefore the most suitable and economically/environmental viable option for the open pit mining.

For this alternative, the open cast pit, waste dumps (burden, softs and topsoil), PCD and trenches, mine access roads, stormwater management infrastructure and buildings (parking, laydown areas, stores, offices, change house/lamp room and workshops) will be located on the same property where mining is going to take place.

6.10.4 the technology to be used in the activity;

Mining Method will be an open cast. Underground mining method may be considered in future when the commodity priced get favourable and near surface resources are depleted. In terms of the technologies proposed, these have been chosen based on their long-term success in terms of mining history, therefore no other alternatives have been considered.

6.10.5 the operational aspects of the activity; and

Water from natural groundwater resources: It has been indicated that water for the wash plant would be abstracted from boreholes. Water obtained from dirty water containment facilities: Water would be obtained from dirty water containment facilities such as the PCD. For example, water for dust suppression will be sourced from the PCD. A Section 21 (a) water use for abstraction of groundwater will form part of the IWULA. The operation and maintenance of the processing plant will be outsourced to a contractor. However, Kedjona Mining will appoint a Plant Manager whose responsibility will be to ensure the efficient and effective operation of the processing plant. An Engineer will also be appointed whose responsibility will be to ensure that all legal requirements of the MPRDA and the Mine Health and Safety Act (MHSA) are complied with.

The operations of the proposed mining involve the open cast mining, the processing plant, pollution control dams, workshops, material stockpiles, storage, excavations, access roads diesel area, and wash bays etc. No feasible alternative operational aspect methods currently exist.

6.10.6 the option of not implementing the activity.

Should the proposed mining development not take place, it entails that the land will continuously be used for agricultural activities, depending on the landowners needs and desirability for the future. Agriculture is undoubtedly one of the most important sectors in South Africa, with agriculture contributing to Mpumalanga GDP, but not nearly as much as the mining sector. The socio-economic impacts of no implementing the project include local, regional, and more than likely national impacts:

- a) Local and regional: planned socio-economic initiatives within the surrounding communities will not be realised; and
- b) National: Loss opportunities in foreign exchange for South Africa will be incurred as the potential to sell the minerals internationally will be lost.

The environmental, social and economic impacts will be assessed in detail during the EIA phase to identify and address all negative impacts, where possible. Whether the No-Go alternative is viable cannot be addressed at this time and will be discussed in more detail during the EIA phase.

Should the mining right application be rejected, there will be a significant loss to valuable information regarding the mineral status present on these properties. In addition to this, should economical reserves be present, and the applicant does not have the opportunity to mine, the opportunity to utilize these reserves for future phases will be lost and the agricultural activities currently undertaken will continue.

6.11 Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The stakeholder engagement process forms an important part of the Scoping and environmental impact assessment Phase of the project. The stakeholder engagement process is primarily aimed at affording Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key stakeholders, and I&AP's is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether the project will affect them and provide the EIA team with local knowledge of the area and raise concerns relating to the biophysical, socio-economic and cultural impacts that may arise.

The stakeholder engagement process is conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA. Chapter 1 of the NEMA outlines the principles of environmental management, several pertaining to public consultation (e.g. Chapter 1, subsections (2), (3), (4) (f), (g), (h), (k), (q) and (r). Chapter 6, Regulations 39 – 44 of the amended EIA Regulations GNR) 982, promulgated on 8 December 2014, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA. In 2017, the Minister of Environmental Affairs published, in terms of Section 24J of the NEMA, Public

Participation Guidelines which guide the Public Participation Process (PPP) to give effect to Section (2)(4)(f), (o) and 24 (1A)(C) of the NEMA.

The application will be submitted to the DMRE for authorisation as the competent authority. Identified commenting authorities on this application include:

- a) Department of Water and Sanitation;
- b) Mpumalanga Heritage Resource Agency;
- c) Dept of Environmental Affairs (DEA);
- d) Department of Forestry and Fisheries (DAFF);
- e) Department of Rural Development and Land Reform (DRDLR);
- f) Mpumalanga DEDET (Department of Economic Development, Environment and Tourism);
- g) Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA);
- h) Department of Agriculture and Land Administration;
- i) Department of Agriculture, Rural Development and Land Reform;
- j) Department of Energy;
- k) Nkangala District Municipality, and
- l) Emakhazeni Local Municipality.
- m) Mpumalanga Tourism & Parks Agency (MTPA)

6.11.1 Details of the Public Participation Process Followed

6.11.1.1 Stakeholder Identification Interested and Affected Parties

An I&AP's database was developed using existing database Prospecting Right Application which is located on same properties being applied for. Registered I&AP's were further sourced from responses to the advertisements, site notices and written notification to I&AP's associated with this specific project. The I&AP's register will be maintained for the duration of the study where the details of stakeholders are captured and automatically updated upon communication to the EAP. The identification, registration, and comments from I&AP's will be an on-going activity. Kimopax also conducted deeds search to identify the landowners adjacent to and in the immediate surroundings of the area. Notification letters were sent to all landowners via emails to notify them about the proposed project.

6.11.1.2 Confirmation of Land Claims

Kimopax approached the Office of the Mpumalanga Regional Land Claims Commissioner to verify whether any possible land claims existed on the affected properties. Kimopax is still awaiting the Department response.

6.11.1.3 Notification and Registration of the I&APs

Kimopax made use of various methods to inform stakeholder of Kedjona intention to undertake the required EA/WML and water use authorisation processes. Stakeholders were provided with the opportunity to participate and register as I&AP's during the announcement phase of the project. This was done by placing an advert on the newspaper and distributing BIDs via email and by hand to the I&APs.

6.11.1.4 Distribution of Notification Letter

Notification letters were sent via email to identified I&AP's informing them of the proposed project.

6.11.1.5 Site Notice Placements

Sites notice boards (Size A2: 600 mm X 420 mm) (English) notifying stakeholders and I&AP's of the proposed activity were placed at conspicuous places in the project area.

6.11.1.6 Newspaper Advertisement

Newspaper advertisements in English notifying stakeholders about the proposed project and the opportunity to participate in the EIA process were placed in the Middleburg Observer newspaper on 04 March 2022.

6.11.1.7 Public Meeting

Stakeholders will be invited to a public meeting where the contents of the Draft Environmental Impact Assessment Report and Plan of Study will be presented. The stakeholders will have the opportunity to comment on the report and plan of study and raise issues that may need to be included in the impact assessment phase. All comments received will be incorporated into the Comments and Response Report.

6.11.2 Notification of the Availability of the Draft Environmental Impact Assessment Report

Draft Environmental Impact Assessment report was distributed to all registered I&APs and also state organs for review and comments.

6.11.3 Stakeholder Commenting Period

The Environmental Impact Assessment Report was made available for a 30-day commenting period. Copies of the Draft Environmental Impact Assessment Report will be placed at public venues such as Local and District Municipality, community library. The Environmental Impact Assessment Report will also be made available to the competent and commenting authorities during the 30-day stakeholder review and commenting period. All comments received will be incorporated into the Environmental Impact Assessment Report. All comments raised by stakeholders will be recorded and will be included in the Final Environmental Impact Assessment Report. The comments will also be collated into the Comments and Responses Register (CRR) which will form an Appendix to the final Environmental Impact Assessment Report.

6.11.4 Comment and Response Report

A summary of comments received will be included in the CRR, which will form an Appendix to the Final Environmental Impact Assessment Report.

6.11.5 Public Participation process going forward

The Public Participation Process will be ongoing throughout all the project phases. The stakeholder engagement proposed for the Impact Assessment Phase is presented below.

6.11.5.1 Stakeholder engagement during impact Assessment phase

Stakeholder engagement during the Impact Assessment will focus on providing information and opportunity for public comment on the findings and recommendations of the impact assessment and management programme/plan. The draft findings were presented in the Draft EIA / EMPr Report to be reviewed and commented on by the public.

The availability of the Draft EIA and EMPr Report for public comment was announced in the same newspaper as for project announcement.

Registered I&AP's was informed through letters distributed by email in advance of the report being made available. Stakeholders was invited to a public meeting where the contents of the Draft EIA/EMPr will be presented, and stakeholders will have the opportunity to comment.

Stakeholders was invited to comment on the Draft EMPr Report in any of the following ways:

- a) By raising comments during meetings where the content of the Draft EIA/EMPr Report will be presented;
- b) By completing comments forms available with the report at public places, and by submitting additional written comments, by email or fax, or by telephone, to the stakeholder engagement office; and
- c) The draft EIA/EMPr Report was available for comment for a period of 30 days at public places in the project area as per the announcement and scoping phase;

All comments and issues raised during the comment period will be added to the Comments and Response Report (CRR) that will accompany this Final EIA/EMPr Report.

6.11.5.2 Notification of Authority Decision

Registered stakeholders were advised in writing of the authority decision on the EIA / EMPr, and details on the procedure to appeal the decision. Notification to registered stakeholders will summarise the authorities' decision and provide information according to legal requirements on how to lodge an appeal should they so wish.

6.11.6 Summary of issues raised by I&As

(Complete the table summarising comments and issues raised, and reaction to those responses)

Interested and Affected Parties		Date	Issues raised	EAPs response
List the names of persons consulted in this column, and		Comments Received		issues raised
Mark with an X where those who must be consulted were in fact consulted.				
<u>AFFECTED PARTIES</u>				
Landowner/s	X			
Adie Erasmus (Landowner Representative)		18/02/2022	<p>Yesterday's meeting regarding the Kedjona Mining and Exploration mining right application has reference.</p> <p>Herewith the conditions as discussed and to be included in the minutes of the said meeting:</p> <p>CONDITIONS FOR CONTINUATION OF PROCESS:</p>	<p>Could you kindly assist or advise how we must handle "the Attorney of your choice to certify our documents" request,</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>a. Written confirmation, contained in an Affidavit taken down by an Attorney of our choice, that all requirements and conditions of the applicable Act and Regulations (and its successors), stipulated in the in the Prospecting Right document have been fully complied with;</p> <p>b. Written confirmation, contained in an Affidavit taken down by an Attorney of our choice, that all requirements and conditions of the Prospecting Right document has been fully complied with;</p> <p>c. Submission to us of certified documents (certified by an attorney of our choice) required by clause 13 “Records and Returns” of the Prospecting Right document; and</p> <p>d. Written proof contained in an Affidavit taken down by an Attorney of our choice that prospecting has indeed been undertaken in accordance</p>	<p>considering we are based in Gauteng, do you have any Attorney in mind so to liaise with him/her?</p> <p>In the meantime, please find attached documents.</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>with the conditions of the Prospecting Right document.</p> <p>e. In the event of execution of prospecting, submission of certified copies (certified by an Attorney of our choice) of the results of prospecting.</p>	
<p>Adie Erasmus (Landowner Representative)</p>	<p>03/04/2022</p>	<p>1. Description of proposed mining activity (Section 3 of the Draft SCR)</p> <p>Very little information regarding the scope of the proposed mining activity is provided in the Draft SCR. The following is not provided:</p> <ul style="list-style-type: none"> • Layout plan indicating proposed location of box cut for mine or associated infrastructure. • Mine plan indicating where the box cut will be located and how mining will take place (in what direction). 	<p>Magnetite magnetic separation ore processing plant is preferred for this project.</p> <p>The information regarding the</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<ul style="list-style-type: none"> • Layout plan indicating where the associated infrastructure will be located (e.g. processing plant, buildings, etc.). • Layout plan indicating where the three proposed waste dump sites will be located. <p>Draft layout plan is attached.</p> <p>No information regarding what type of processing plant will be established on site is provided. In Section 7.1.5, it is indicated that a washing plant will be required but no further information is provided in the Draft SCR.</p> <p>It is understood that a Waste Management licence is also being applied</p>	<p>identified waste activities will be provided in the final report.</p> <p>The site-specific need and desirability has been outline on the final report.</p> <p>Motivation for preferred site is based on the availability of</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>for. However, no information regarding the identified waste activities is provided in the Draft SCR.</p> <p>2. Need and desirability of the proposed activities (Section 5 of the Draft SCR)</p> <p>The motivation provided is a generic motivation that could be used for any mining application. It does not indicate the need and desirability of the activity in the context of the proposed location. It is evident that the Guideline on Need and Desirability (DEA: 2017) has not been considered.</p> <p>3. Alternatives (Section 7, 14 and 16, 17.1 of the Draft SCR)</p> <p>The Draft SCR is lacking in terms of project alternatives considered and reasons why the preferred alternatives were chosen.</p>	<p>the Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM) on the proposed area.</p> <p>The engineering designs, specialist</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>Motivation for the alternatives chosen is based on the geological information of the site which is lacking as indicated in Point 5 of this letter.</p> <p>The following was not provided as part of the Draft SCR:</p> <ul style="list-style-type: none"> • Conceptual/initial site layout plan or alternative site layout plans; • Conceptual/initial mine plan or alternative mine plans. • Comparison of site layout/mine plans and the plan of environmental features and current land uses. <p>Interested and Affected Parties could therefore not provide any input in terms of these plans and potential impacts. A final site layout plan was also not provided as part of Draft SCR. However, Section 16 provides a</p>	<p>inputs, and I&AP comments, alternatives have been considered and this will be incorporated into the final report. The recommendations made by all of the above will be outlined in the final report.</p> <p>The specialist studies</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>motivation regarding the preferred site (once again based on the geological information – see comments in Point 5 of this letter) – this motivation is questioned.</p> <p>No site specific environmental information was provided (see comments in Point 5 of this letter) and therefore reference to a specialist scoping assessment indicating no fatal flaws is questioned (Section 14 of Draft SCR). Specialist studies still need to be undertaken in the EIA phase (see Section 17 of the Draft SCR).</p> <p>In Section 17.1, the following is stated: During the Scoping Phase, based on professional judgement of the EAP, the engineering designs, specialist inputs, and I&AP comments, alternatives have been considered.</p> <p>The following was not provided in the Draft SCR as stated: engineering</p>	<p>will be undertaken and the site specific information will be provided for your perusal.</p> <p>All identified and stakeholders and the others that were provided by the Landonwer have been consulted and the</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>designs, specialist studies, I&AP comments – as previously indicated alternatives were not properly identified and assessed in this Draft SCR.</p> <p>4. Public Participation Process (Section 8 of the Draft SCR)</p> <p>A table is provided in Section 8.3 of the Draft SCR that contains no information regarding Interested and Affected Parties identified through the scoping process or issues raised regarding the proposed mining project.</p> <p>The following information was not provided in the Draft SCR:</p> <ul style="list-style-type: none"> • Landowners/users (including farmworkers) who will be directly affected by the proposed mining project; • Adjacent landowners/users (including farmworkers) who could 	<p>consultation will be recorded on the final report.</p> <p>The information will be included in the Environmental Impact Assessment report.</p> <p>The indicated issues will be incorporated</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>indirectly be affected;</p> <ul style="list-style-type: none"> • Relevant municipal councillor; • Relevant municipality; • Identified organs of state to be consulted; • Communities, etc. <p>A map indicating the location of the identified landowners/users as well as the adjacent landowners/users was also not provided in the Draft SCR.</p> <p>My client, Mr. Francois Prinsloo of the farm Leeuwklip, registered as an Interested and Affected Party by forwarding a completed comment sheet (dated: 20 September 2021; Appendix 4 of the Draft SCR). Issues of</p>	<p>into the final report.</p> <p>The final scoping report was submitted before the meeting and the minutes will be recorded in the final report. The public meeting will be held and all stakeholders will be invited in order to</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>concern were indicated by Mr. Prinsloo but not recorded in the table provided in Section 8.3. In addition, Mr. Prinsloo also provided a list of landowners (with contact numbers), direct neighbours (with contact numbers) and other I&APs (with contact numbers) to be contacted by the consultant. This information was not included in the Draft SCR.</p> <p>Other issues were also indicated by Mr. Prinsloo in emails (dated: 28 June 2021; 5 January 2022; Appendix 4 of the Draft SCR) but not recorded in Section 8.3 of the Draft SCR.</p> <p>No reference is made to the letter from AdiEnvironmental cc (dated: 4 November 2021; attached for your information – Annexure 1) in which additional issues were indicated. In addition, the meeting of 17 February 2022 is not mentioned and a copy of the minutes (attached for your</p>	<p>give them opportunities to raise their concerns regarding the project.</p> <p>Information of the jurisdiction of the site has been correctly provided on the EIR.</p> <p>The information</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>information – Annexure 2) not included as part of the Draft SCR.</p> <p>It should be noted that I&APs were not invited to attend any public meetings during the scoping phase as mentioned in Section 8.1.7 of the Draft Scoping Report.</p> <p>From this review, it is evident that the Public Participation Guideline (DEA: 2017) has not been considered.</p> <p>5. Baseline Environmental Information for the site (Section 9 of the Draft SCR) In the Executive Summary, it is indicated that ‘the scoping report provides a general description of the status quo of the receiving environment in the project area. It serves to set the scene and provide context to the area within which the scoping exercise was conducted. This section also includes the main issues/impacts associated with each</p>	<p>regarding the ore reserve have been included the report which was provided to you by the client.</p> <p>The land use map is attached on the EIR.</p> <p>The land use map is attached on the EIR.</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>aspect and how the proposed project will affect the biophysical and social environment’.</p> <p>Socio-economic Profile (Section 9.1.1.1), Demographic Profile (Section 9.1.1.2) and Local Economic Development (Section 9.1.1.4)</p> <p>Information in terms of the Steve Tshwete Local Municipality is provided. This is incorrect as the site falls under the jurisdiction of the Emakhazeni Local Municipality.</p> <p>Site specific information (i.e. the socio-economic profile and demographic profile of the proposed site and immediate surrounding area) must be provided so that the potential impact of the proposed mining operation can be quantified.</p>	<p>Noted, it will be addressed on the EIR.</p> <p>The specialist studies will be undertaken and we will announce a week before the commencement of the assessment on site.</p> <p>A site visit will be</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>Biophysical Environment (Section 9.1.1.3)</p> <p>In terms of the biophysical environment, only information (generic and not site specific) regarding the following was provided: regional and local geology; climate and precipitation; topography.</p> <p>Site specific information regarding the following must be provided for the entire mining site (4188.1577 ha): geology, topography, soil, land capability, agricultural potential, natural vegetation, animal life, surface water, wetlands, groundwater, sites of archaeological and/or cultural interest, palaeontology, air quality, noise, sensitive environments, sense of place, etc. Without this information, the potential impact on the environmental features of the mining site cannot be determined.</p> <p>In terms of geology, information obtained from literature was provided</p>	<p>arranged and all site specific information will be incorporated on the EIR</p> <p>The information will be amended accordingly.</p> <p>Issues raised by Mr. Francois Prinsloo will</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>but not referenced as such.</p> <p>In the Executive Summary it is indicated that a mining right for a total of 9 minerals namely, Iron Ore, Titanium, Vanadium, Chrome, Copper, Nickel, Cobalt, Gold and Platinum Group Metals, was granted. No information regarding these minerals and the reserves identified on the site during the prospecting phase (location, depth, etc.) was provided in the Draft SCR. Without this information, the feasibility of this mining project is questioned.</p> <p>The above-mentioned information would have been required in order to compile the required Mining Work Programme (that includes a mine plan) demonstrating the feasibility of the project to the DMRE.</p> <p>The above-mentioned comments regarding geology is also applicable to</p>	<p>be addressed as they will be incorporated on the EIR.</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>the following sections of the Draft SCR:</p> <ul style="list-style-type: none"> • Section 7.1.1 (reference to location of existing mineral resource); • Section 7.1.2 (reference to presence of these minerals within the proposed site, etc.); • Section 7.1.3 (reference to geology of the area; position of mineral reserves to be exploited, etc.); • Section 7.1.4 (reference to near surface resources are depleted, etc.); • Section 7.1.6 (reference to significant loss to valuable information regarding the mineral status present on these properties, economical reserves be present, etc.) • Section 14 (reference to location of mineral resource and proven 	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>reserve);</p> <ul style="list-style-type: none"> • Section 15 (reference to location of mineral resource and proven reserve; location of the mining operation is determined by the viability of the mineral reserve; etc.); • Section 16 (reference to location of mineral resource and proven reserve); <p>Description of current land uses (Section 9.2)</p> <p>The following is stated: The land uses in the proposed site consist of crop farming and livestock. This is a general statement and does not reflect the current land uses for the entire site.</p> <p>Site specific information regarding the current land uses of the entire</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>mining site (4188.1577 ha) and immediate surrounding area must be provided so that the potential impact of the proposed mining operation can be quantified. A map must be provided indicating the current land uses on site and directly adjacent to the site – the required map was not provided as indicated in Section 9.4.</p> <p>Description of specific environmental features and infrastructure on site (Section 9.3)</p> <p>In this section, mention is made of the Steelpoort River (cuts across the site in the middle on the area flowing in a north-south direction), Eskom lines (traverse in the far western portion of the area in a north-south direction) and railway lines (following the same pattern). No mention is made of homesteads and associated infrastructure present on site.</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>Site specific information regarding the following must be provided for the entire mining site (4188.1577 ha): geology, topography, land use (including existing infrastructure), soil, land capability, agricultural potential, natural vegetation, animal life, surface water, wetlands, groundwater, sites of archaeological and/or cultural interest, palaeontology, air quality, noise, sensitive environments, sense of place, etc.</p> <p>Description of specific environmental features and infrastructure on site have been outlined on the EIR.</p> <p>Environmental and current land use map (Section 9.4) (Show all environmental, and current land use features) The following is stated: Attached as appendix.</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>The required environmental and current land use map was not attached as an appendix to the Draft SCR.</p> <p>6. Impacts identified (Section 10 and Section 12 of Draft SCR) The following was not provided as part of the Draft SCR:</p> <ul style="list-style-type: none"> • Conceptual/initial site layout plan or alternative site layout plans; • Conceptual/initial mine plan or alternative mine plans. • No comparison of alternative layout plans. <p>Interested and Affected Parties could therefore not provide any input in terms of these plans and resultant potential impacts.</p> <p>However, the following anticipated impacts on geology; topography; air</p>	

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		<p>quality; soil, land use and land capability; biodiversity; surface water; noise; climate change; hydrogeology, blasting and vibrations; visual; heritage; socio-economic and traffic were identified. No anticipated impact on Interested and Affected Parties (including landowners) was noted.</p> <p>It should be noted that the anticipated impacts listed in Section 10 differ from those listed in the Executive Summary (see Anticipated impacts).</p> <p>Due to the lack of information as indicated in the preceding sections, the positive and negative implications of the project (Section 12 of Draft SCR) as indicated by the EAP are questioned.</p> <p>7. Plan of study for the Environmental Impact Assessment process</p>	

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		<p>(Section 17 of Draft SCR)</p> <p>Specialist studies</p> <p>Specialist studies must still be conducted as part of the EIA phase of the project. Specialist studies to be undertaken are listed in the Executive Summary and Section 17.3 of the Draft SCR.</p> <p>In the Executive Summary (Anticipated Impacts), the following was indicated: Possible contribution to climate change through emission of Green Houses gases. However, no mention is made of a climate change specialist study. In addition, a wetland delineation study and a palaeontological study were also not listed to be undertaken.</p> <p>Terms of reference for the listed specialist studies were not provided. It</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>was also not indicated who will conduct the said specialist studies.</p> <p>Public participation</p> <p>In view of the lack of public participation undertaken during the scoping phase (see comments in Point 4 of this letter), additional public participation needs to be undertaken during the EIA phase.</p> <p>Additional public participation have been undertaken during the EIA phase and all comments raised are incorporated on the final report.</p> <p>8. Assumptions and Limitations (Section 17 of Draft SCR)</p> <p>The following is stated in the Draft SCR: The project area environment was assessed through site visits, desktop screening, incorporating existing information from previous studies and input received from</p>	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>authorities and I&APs to date. A refinement of all maps will also be undertaken in the EIA phase, if necessary.</p> <p>The information provided in the Draft SCR is not site specific as indicated in the preceding sections and the comments and inputs from the stakeholders and Interested and Affected Parties were not incorporated into the Draft Scoping Report.</p> <p>9. Undertaking regarding correctness of information and level of agreement (Section 18 and Section 19 of Draft SCR)</p> <p>An undertaking in this regard was provided and signed by the consultant.</p> <p>However, the information provided is not site specific as indicated in the preceding sections and the comments and inputs from the stakeholders</p>	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>and Interested and Affected Parties were not incorporated into the Draft Scoping Report. Therefore, Interested and Affected Parties have not agreed with the findings as presented in the Draft Scoping Report.</p> <p>10. Information previously requested</p> <p>Information regarding the results of the prospecting application was previously requested (letter from Adi Environmental, dated: 4 November 2021) but to date, has not been provided.</p> <p>In addition, the following information/documentation must be provided for review purposes:</p> <ul style="list-style-type: none"> • A copy of the Mining Work Programme as submitted to the DMRE as part of the mining right application. 	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<ul style="list-style-type: none"> • A copy of the acceptance letter from the DMRE with regards to the mining right. • A copy of the application form submitted to the DMRE. • A copy of the acceptance and/or approval letter from the DMRE. • A copy of the screening report (i.e. the report generated by the national web based environmental screening tool) submitted to the DMRE. <p>Concluding remarks</p> <p>The Draft SCR evaluated is a generic Scoping Report lacking project specific and site specific information as indicated in the preceding sections. Without project specific and site specific information, the</p>	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>potential impact on the environment (including I&APs) cannot be predicted.</p> <p>I&APs are thus unable to determine how the proposed mining project will impact them and their agricultural activities and are also unable to provide input.</p> <p>Issues of concern were provided by my client (Mr. Francois Prinsloo) but were not included and addressed in the Draft SCR.</p> <p>It is thus evident that the Draft SCR does not contain all information set out in Appendix 2 of the EIA Regulations, 2014 (as amended) and therefore does not comply.</p> <p>The EIA process followed is questioned in view of the availability of the</p>	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>EIR & EMPr being advertised at the same time as the Scoping Report (advert in Middelburg Observer dated 4 March 2022).</p> <p>A copy of the Final Scoping Report (including comments received from I&APs) submitted to the DMRE as well as a copy of the acceptance/approval from the DMRE regarding the submitted Final Scoping Report must be provided for review purposes.</p> <p>Please indicate when the Water Use Licence Application with regards to this project will be made available for evaluation. A copy of this application must be forwarded to Adi Environmental cc for evaluation/review purposes (see letter dated: 4 November 2021; Annexure 1)</p>	

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>The final scoping report had already been submitted to the competent authority and the EIA phase had already been commenced. It noted that a copy of Water Use License Application will be provided to you for your review.</p> <p>Until further notice, my client (Mr. Francois Prinsloo of the farm Leeuwklip) objects to the proposed mining right application (Kedjona Mining and Exploration Pty Ltd.; DMRE REF NO.: MP30/5/1/2/2/10352 MR) in view of the potential impact the issuing of the said right would have on his agricultural activities and business. This is in view of the lack of site and project specific information provided in the Draft Scoping Report and the lack of consultation to date.</p> <p>Further comment regarding this application will be provided upon</p>	

Interested and Affected Parties		Date	Issues raised	EAPs response
List the names of persons consulted in this column, and		Comments		issues raised
Mark with an X where those who must be consulted were in fact consulted.		Received		
			review of the Final Scoping Report and the Draft EIR & EMPr (including specialist studies).	
Johann Minnaar	X	14-04-2022	<p>On 17 March 2022 you sent an E Mail to tcekleinhans@gmail.com which E Mail was forwarded to my client on 24 March 2022. The draft Environmental Assessment Report and the draft Environmental Management Programme Report, as one document (hereinafter referred to as “the draft EMPr”) was attached to this E Mail.</p> <p>My client, as landowner and commercial farmer of the above-mentioned properties, is an Affected and Interested Party in terms of the provisions of the Mineral and Petroleum Resources Development Act, No. 28 of 2002 (“MPRDA”), as amended by the Mineral and Petroleum Resources Development Amendment Act, No. 49 of 2008 (“MPRDAA”) the</p>	<p>We acknowledge your comments and we reserve your rights as Landowner to raise concerns regarding the proposed project.</p> <p>Well received, and we will retrieve the information for the</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>Environmental Impact Assessment Regulations, No. R 982 of 4 December 2014 ("EIAR") read with the National Environmental Management Act, No.107 of 1998 ("NEMA"), and the National Water Act, No. 36 of 1998 ("NWA").</p> <p>Your attention is drawn to the provisions of Regulation 40(2) of the EIAR which states that <i>"The public participation process contemplated in this regulation must provide access to <u>all information</u> that has or may have the potential to influence any decision with regard to an application..."</i></p> <p>In order for my client to be placed in a position to ascertain how it rights as land owner and commercial farmer may be affected by the above-mentioned applications, and to be able to study and to scrutinize the contents of the above statutory required documentation, you are</p>	<p>prospecting right application in order to verify the consultation with your client.</p> <p>Please note that the infrastructure layout map will be included in the final report.</p> <p>The project is</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>requested to provide my client with copies of the following documentation which the Applicant has submitted to the DMRE when it has applied for a mining right in terms of the provisions of Section 22 of the MPRDA, namely:</p> <ol style="list-style-type: none"> 1. Acceptance Letter received from the DMRE confirming the acceptance of the application for a Mining Right; 2. Draft Mining Work Programme (“MWP”); 3. The technical competency of the Applicant; 4. The financial resources of the Applicant; 	<p>currently on application to environmental authorisation for mining right.</p> <p>The specialist will commence with the assessment when the applicant receives the approval for the draft scoping report.</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>5. The BEE status of the Applicant;</p> <p>6. Application for an environmental authorisation, and an acceptance letter that such application was approved by the DMRE as leading authority.</p> <p>Needless to say, information in the draft MWP, and the documents which have to be submitted when application for a mining right and an environmental authorisation is made, certainly have the potential to influence decisions of affected and interested parties, including my client, to the application for a mining right and an environmental authorization, also when comments are considered concerning the contents of the statutory documents which are required in terms of the EIAR, NEMA and</p>	<p>The scoping report was made available to all identified stakeholders at that time, and we will attach it with these response to your comments.</p> <p>The report is still in draft form and it is</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>the NWA.</p> <p>It must be borne in mind that the Applicant has applied for a mining right in terms of the provisions of the MPRDA and the MPRDAA, and my client as affected and interested party per definition in that Acts is entitled to all the documents submitted by the Applicant pertaining to such application in order for my client to ascertain how and to what extent its rights as landowner will be affected by the proposed prospecting operations.</p> <p>My client has the right in terms of Section 10 of the MPRDA to object against the application for a mining right by the Applicant, but his right to object is frustrated by the fact that the Applicant has not provided the above-mentioned documents.</p> <p>It is noted in the contents of your E Mail dated 17 March 2022 that the</p>	<p>made for the public comments.</p> <p>Need and Desirability will be fully addressed on the final report.</p> <p>Noted, the socioeconomic conditions of the specific area will be</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>Applicant <i>“is currently applying for a mining right”</i>. The inference can thus be drawn that the Applicant has as yet not applied in terms of Section 22 of the MPRDA and the MPRDAA for a mining right and an environmental authorisation, or such applications were not as yet been approved by the Department of Mineral Resources and Energy (“DMRE”) as the leading authority.</p> <p>You as the Environmental Assessment Practitioner (“EAP”) must register my client as Affected and Interested Party as such, and put its detail, and my firm as its authorized consultant, on the data base for this Project, and notify and advise my client and the writer with all public consultation notices and future documents and correspondences regarding the consultation process. In this respect it is placed on record that my client notified you on 4 February 2022 of its E Mail address as per the</p>	<p>assessed during the EIA phase.</p> <p>All comments raised and their respective responses will be outlined on the final EIA report.</p> <p>The land will be assessed during the</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>Questionnaire which you provided to my client. Despite the fact that my client's E Mail address is on your records, you forwarded on 17 March 2022 the draft EMPr to a different address.</p> <p>PROCEDURAL UNFAIRNESS</p> <p>Listing Notice 2 as referred to in Government Notice 984 dated 4 December 2014 requires that:</p> <p>3.(1) The activities listed in Appendix 2 are identified in terms of Section 24(2)(a) of the Act as activities that may not commence without an environmental authorisation from the competent authority.</p> <p>(2) The investigation, assessment, and communication of potential impact of activities must follow the procedure as prescribed in regulations 21, 22</p>	<p>EIA phase and potential impacts will be correctly identified.</p> <p>The specialist will assess the area and environmental impacts will be identified.</p> <p>The site layout plan</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>and 23 of the Environmental Impact Assessment Regulations, 2014.</p> <p>Appendix 2 identified activities associated with a mining and mineral processing, and when applying for a mining right, which requires that the procedure as referred to above must be followed.</p> <p>In terms of regulation 21(1) of the EIAR the applicant must, within 44 days of receipt of the application by the competent authority, submit to the competent authority a draft Scoping Report which has been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority.</p> <p>My client has not received any draft Scoping Report thus far, and obviously had not had the opportunity to comment or to raise concerns</p>	<p>will be provided on the final report.</p> <p>Air quality specialist will assess the area and site specific information for dust monitoring points will be put within the proposed mine area to monitor the dust fallout prior to</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>as to the contents of such draft Scoping Report. As a matter of fact, it is unknown to my client if the DMRE is in receipt of the Applicant's application for an environmental authorisation. You are requested to provide my client with a copy of such application.</p> <p>From the contents of your E Mail dated 17 March 2022 you advised that "A full Environmental Impact Assessment (EIA) including Scoping and Impact Assessment will be followed...". The inference can be drawn that such draft Scoping Report was not yet been submitted to affected and interested parties, including my client. Obviously, such Draft Scoping Report was also not been approved by the leading authority.</p> <p>In terms of regulation 23(1) of the EIAR, the applicant must within 106 days of the acceptance of the scoping report submit to the competent</p>	<p>mining.</p> <p>Noise impact assessment will be undertaken on site.</p> <p>Traffic impact assessment will be</p> <p>Geohydrological impact assessment will be undertaken on</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>authority an environmental impact report <u>inclusive of any specialist reports</u>, and an EMPr, which must have been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received to the draft Scoping Report, including any comments of the competent authority.</p> <p>It is clear that the Applicant cannot submit to affected and interested parties, including my client, for comments, a draft Environmental Impact Assessment and Environmental Management Report if the draft Scoping Report was not submitted to affected and interested parties for comments and concerns as referred to in the above quoted statutory requirements.</p> <p>The Draft EIA and Draft EMPr which you have submitted to my client, and</p>	<p>site and potential impacts will be assessed.</p> <p>Agricultural Impact assessment will be undertaken.</p> <p>We acknowledge your objections. Find the attached documents as per your request and we are giving an</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>presumably to all affected and interested parties, does not meet the requirements of regulation 23(1) of the EIAR as referred to above, and is rejected by my client in its totality. It is noted that such purported EMPr does not include any environmental specialist studies.</p> <p>The EIR must contain all information as set out in Appendix 3 of the EIAR, and all information in a specialist report must conform to the information as set out in Appendix 6 of the EIAR. This is not the case in your purported EIA and EMPr.</p> <p>COMMENTS AND RESPONSES TO THE CONTENTS OF THE PURPORTED DRAFT EIA/ EMPr AND ANNEXURES</p>	<p>opportunity to raise concerns.</p> <p>The application has been accepted by the Department of Mineral Resources and Energy (“DMRE”) as the leading authority and attached is the acceptance letter.</p> <p>Your concern is</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>Comments which we made in this letter to the purported draft EIA and Draft EMPr must not in any way be construed or be implied that my client condones the procedural unfairness to the public consultation process with affected and interested parties, including my client.</p> <p>It is noted on page 5 that the Applicant was granted on 16 January 2009 a Prospecting Right over, inter alia, the affected property. At this stage my client reserves its rights in order to ascertain whether or not it was consulted as landowner and affected and interested party in respect of the granting of the Prospecting Right.</p> <p>The description of the development of the proposed mine and infrastructure is of a summary nature and does not give any detail as to the locality of these mining pits and infrastructure. No locality map of the</p>	<p>acknowledged and we will send the notifications as well as the documentations to the correct email address.</p> <p>The client will not commence with mining activities before the record of decision issued and if an environmental authorisation is not</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>mining infrastructure is included in the document.</p> <p>It is noted on page 5 that applications were made by the Applicant on 21 May 2021 to the DMRE for a mining right, environmental authorisation and a waste management licence, and that these applications were accepted by the DMRE on 1 December 2021. This statement is in contradiction to the statement made in your E Mail dated 17 March 2022 where you stated the Applicant <i>“is currently applying for a mining right”</i>.</p> <p>The contents of the last paragraph on page 5, namely <i>“The potential environmental impacts associated with the mining activities will be identified through the EIA report of the EIA Study, assessed and significance of impacts determined through the Environmental Impact Report and managed through a detailed Environmental Management Programme</i></p>	<p>favourable to the applicant, we will still notify you of the decision.</p> <p>All relevant procedures were followed when applying for the mining right and the process is on-going. In a case where relevant procedures were not followed; the</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p><i>(EPPr)</i>", clearly referred to future reports, and not to this purported draft EIA and draft EMPr, as no environmental specialist studies were included or considered with the drafting of the draft EMPr.</p> <p>The statement on page 5, namely. <i>"The opportunity to participate in the EIA and to register as an Interested and Affected Party (I&AP) was announced in June 2021 through the following means....C) Letter of invitations to register and background information documents..."</i>, is incorrect, as my client was only advised per E Mail on 5 January 2022 to register as affected and interested party, and the BID, and Questionnaire was included in this E Mail.</p> <p>We acknowledge that we sent the invitation on the 5th of January 2022 and note that the public participation is on-going. Some of the directly</p>	<p>applicant will revise all the requirements and make amendments to such.</p> <p>The scoping report which has been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, has been submitted to</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>affected parties were identified after we have received the acceptance letter on December.</p> <p>The statement on page 9, namely <i>“The Draft Scoping Report was made available for a 30day commenting period”</i>, is blatantly incorrect (see my comments above concerning this issue).</p> <p>The statement under paragraph 23.4 proves that this document is incomplete and appears to be in draft form.</p> <p>Paragraph 6.7 dealing with Need and Desirability of the proposed activities is vague and does not address in detail the need and desirability of the proposed activities. No mentioning is made of the tonnage of different commodities which will be mined, and the market for the various minerals and metals. No mentioning is made as to the work force</p>	<p>the competent authority within prescribed 44 days.</p> <p>Noted, and find the attached draft scoping report.</p> <p>The draft scoping report has been made available to all identified interested and affected parties.</p> <p>We have revised the</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>which will be employed by the proposed mine, and if contract mining will be implemented.</p> <p>It is stated that the social and economic impacts will be assess during the EIA phase. In this aspect you are alluded to the provisions of Chapter 5, Section 23(2)(b) of the National Environmental Management Act, No. 107 of 1998 (NEMA) which provides that the Applicant must identify, predict and evaluate the actual and potential impact on, inter alia, the socioeconomic conditions of the area, in this case, specifically to the farming business of my client.</p> <p>The social economic impact of the farm workers who work on the affected property and the properties within the proposed mining area must also be assessed during the EIA phase in terms of an environmental</p>	<p>stakeholder`s database and your client will receive all notifications regarding the proposed mining project.</p> <p>The specialist will be appointed as soon as the scoping report is accepted. We are awaiting the acceptance from the</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>specialist report.</p> <p>It is noted that the summary of issues raised by Interested and Affected Parties in the table on page 56 is blank and does not contain any comments or issues.</p> <p>The statement on page 73 that <i>“there will be no impacts during the construction phase of the project on the land capabilities of the project”</i> is incorrect as farmland has to be destroyed in order to build and construct infrastructure as described in this document, particularly in paragraph 10.1.1 on page 90.</p> <p>The environmental impacts identified in paragraph 8 on page 72 to page 75 have been simplify in general terms, and no environmental specialist studies have been undertaken, or included in this document. It is thus</p>	<p>Department of Mineral Resources and Energy.</p> <p>We acknowledge your comments, and we reserve your rights as Landowner to raise concerns regarding the proposed project.</p> <p>Well received, and we will retrieve the information for the</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>hardly possible to proposed environmental mitigating measures on general statements as made in the above quoted section of the document.</p> <p>It is incorrect to state on page 75 that there was a scoping phase as already pointed out above.</p> <p>Possible mitigation measures as set out in paragraph 9 from page 86 to page 88 are of no use and cannot be assess without environmental specialist studies on the various environmental impacts as referred to under this paragraph of the document.</p> <p>As already pointed out there is no mine site layout plan included in the document and general observations are made in paragraph 9.5.3 on page 89 of the document.</p>	<p>prospecting right application in order to verify the consultation with your client.</p> <p>Please note that the infrastructure layout map will be included in the final report.</p> <p>The project is currently on application to environmental</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>The statement on page 89, namely <i>“Based on experience with past studies on similar mining operations, supported by site-specific specialist studies, it should be possible to predict the impacts on noise, heritage, soils, surface water, groundwater, air quality, the ecology and the local socio-economic and to formulate appropriate mitigation measures”,</i> is a further indication that the contents of the draft EIA/EMPr is based on no specific studies undertaken on the proposed mining area, and the surrounding area, and it appears from this statement that the information contain in this draft EIA/EMPr is not even derived at from desk top studies of the environmental environment of the proposed mining area and its environmental surroundings.</p> <p>Page 90 paragraph 10.2 with regards to Air Quality is general knowledge, but no dust monitoring points have been put within the proposed mine</p>	<p>authorisation for mining right.</p> <p>The specialist will commence with the assessment when the applicant receive the approval for the draft scoping report.</p> <p>The scoping report was made available to all identified stakeholders at that</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>area to monitor the dust fallout prior to mining, and no specialist environmental studies have been submitted to be able to access the effect which dust may have on the environment, and how such environmental damage will be mitigated. The mitigating measures as proposed on pages 93 to 98 are not scientific motivated.</p> <p>Our comments with regards to Noise Impact and its proposed mitigation of environmental degradation as referred to from page 99 to page 102 applies mutatis mutandis to our comments with regard to Air Quality Impact as referred to above.</p> <p>Our comments equally apply mutatis mutandis to Traffic Impacts as documented from page 103 to page 106.</p> <p>The statement on page 107 of the draft EIA/EMPr, namely <i>"The types of</i></p>	<p>time, and we will attach it with these response to your comments.</p> <p>The report is still in draft form and it is made for the public comments.</p> <p>Need and Desirability will be fully addressed on the final report.</p> <p>Noted, the</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p><i>aquifers on the project area will be determined during geohydrological impact assessment. Hydrocensus will be undertaken by the appointed specialist.”</i> is a further indication that the draft EIA/EMPr does not conform to the requirements of the EIAR and can at best be regard as some sort of working document, as the mitigation measures as referred to on page 107 to page 112 is scientific not substantiated.</p> <p>Our comments apply mutatis mutandis to paragraph 10.6 on page 113 to page 128. Further in this regard we disagree with your statement on page 114, namely that <i>“There are soil physical and chemical evidence that crop cultivation was previously practiced in this area. It is not evident why this has ceased and whether it is as a result of climatic constraints or as a result of a change in landownership”</i>. Your statement in this regard is totally incorrect. My client as commercial farmer utilizes the affected property</p>	<p>socioeconomic conditions of the specific area will be assessed during the EIA phase.</p> <p>All comments raised and their respective responses will be outlined on the final EIA report.</p> <p>The land will be assessed during the</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>for the production of maize and soja beans.</p> <p>Your observations and proposed mitigation measures with regards to environmental damages which will occur as a result of your proposed mining with regards to Heritage Impact Assessment, Visual Impact Assessment, Terrestrial Biodiversity (it is noted that “<i>no field investigation was undertaken</i>”, page 137), Health Impact Assessment, Surface Water Impact Assessment, Aquatics Ecology (it is noted on page 153 that “<i>A field assessment will be conduct over two surveys. The selected assessments points will be presented in the final EIR report</i>”)., Blasting Design, Socio- Economic Impacts, Waste Management Impacts, Blasting and Vibration Impact Assessment, and as referred to from page 129 to page 178 are unfounded and scientific not substantiated with the required environmental specialist reports, and are at best general</p>	<p>EIA phase and potential impacts will be correctly identified.</p> <p>The specialist will assess the area and environmental impacts will be identified.</p> <p>The site layout plan will be provided on the final report.</p> <p>Air quality specialist</p>

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.	Date Comments Received	Issues raised	EAPs response issues raised
		<p>observations.</p> <p>The environmental risk factors as a result of the proposed mine as tabulated from page 183 to page 191 is in the light of the above comments at best a wild guess.</p> <p>Suffice to conclude that the purported draft EIA/EMPR is guess work, is not substantiated with environmental specialist studies and does not conform with the relevant provisions of the EIAR as pointed out above.</p> <p>APPLICATIONS FOR WATER USE LICENCES ION TERMS OF SECTION 21 OF THE NATIONAL WATER ACT (“NWA”).</p> <p>It is noted that the Applicant intends to apply in terms of Section 21 of the NWA for the necessary water use licences for water uses which will be</p>	<p>will assess the area and site specific information for dust monitoring points will be put within the proposed mine area to monitor the dust fallout prior to mining.</p> <p>Noise impact assessment will be</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>triggered by its proposed mine.</p> <p>It is clear that the Applicant neither holds a mining right nor an environmental authorisation over the properties.</p> <p>The Department of Water Affairs and Sanitation ("DWA") requires, that when an applicant applies for a Water Use Licence ("WUL"), on properties where the applicant is not the registered owner thereof, that the applicant provides documentary proof that it either have lawful access to the property, or that it has the written authority and consent from the registered owners of the properties to make application for a WUL. In this respect I refer you to the application form and the required Consent Form that must be submitted when an application for a WUL is made, of which the following extraction is included in this letter for your</p>	<p>undertaken on site.</p> <p>Traffic impact assessment will be</p> <p>Geohydrological impact assessment will be undertaken on site and potential impacts will be assessed.</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>information.</p> <p>.12.1 Position or official status: (Please specify if Property Owner or Lessee):</p> <p>(If not the property owner, please submit letter of authority to sign on behalf of the property owner)</p> <p>I declare that the applicant defined in this application has lawful access to the property and carry out the water use activity or activities related to this application. y client has NOT granted any permission or consent to the Applicant to apply for Water Use Licences ("WUL") on its properties, and the Applicant does not hold any rights to lawfully access my client's properties, as explained above.</p>	<p>Agricultural Impact assessment will be undertaken.</p> <p>Consultation with the landowners will be undertaken and the applicant will not commence without the lease agreement.</p>

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>Section 41(5) of the NWA states that;</p> <p><i>" 5) The Minister must align and integrate <u>the process for consideration of a water use license</u> with the timeframes and processes applicable to applications for—</i></p> <p><i>(a) licences, permits or rights for prospecting, exploration, mining and production in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); and</i> ^[L]_[SEP]</p> <p><i>. (b) environmental authorisations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or any specific environmental management act."</i></p> <p>In terms of section 41 (5) of the NWA the requisite timeframes to</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>undertake the Water Use Licence Application ("WULA"), as prescribed in the WULA Regulations, must align with the timeframes to obtain, <i>inter alia</i>, a mining right in terms of the MPRDA and an environmental authorisation in terms of the NEMA.</p> <p>My client, in the light of the aforesaid, requests the DWA not to consider any WULA or the IWWMP until such time as the Applicant has applied for the granting of it of an environmental authorisation, and at such time the Minister of DWA must then align and integrate the process for consideration of a water use license with the timeframes and processes applicable to an application for an environmental authorisation as envisaged by the provisions of Section 41(5) of the NWA.</p> <p>It is clear that applications for a mining right, environmental</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>authorisation, and water use licences cannot be dealt with in isolation but must be dealt with in a parallel manner to each application. CAVEAT</p> <p>It must not be construed or implied that my client necessarily agrees with the contents of the draft EIA/EMPr which we do not specifically address in this letter, and my client's rights are reserved to comments in future on any of those issues if it deems it necessary.</p> <p>WITHOUT PREJUDICE</p> <p>The letter is written without prejudice of any of the rights of my clients, and all their rights are reserved and remain reserved.</p> <p>ACKNOWLEDGMENT OF RECEIPT OF RESPONSES</p> <p>Kindly acknowledge receipt of the letter and confirm that the necessary</p>	

<p>Interested and Affected Parties</p> <p>List the names of persons consulted in this column, and</p> <p>Mark with an X where those who must be consulted were in fact consulted.</p>	<p>Date</p> <p>Comments</p> <p>Received</p>	<p>Issues raised</p>	<p>EAPs response</p> <p>issues raised</p>
		<p>information as affected and interested party has been included into your database for this project.</p>	

7 The Environmental attributes associated with the sites

7.1 Baseline Environment

7.1.1 Type of environment affected by the proposed activity.

(Its current geographical, physical, biological, socio- economic, and cultural character).

7.1.1.1 Socio- Economic Profile

Kedjona Mining operates in Nkangala District Municipality and is situated in the Emakhazeni Local Municipality. Emakhazeni Local Municipality is located within the Mpumalanga Province and is situated in the jurisdictional area of the Nkangala District Municipality. The district is located to the North-West of the province and is the smallest district in land mass (21%) and has the second largest population concentration (35%) in the province. The Nkangala District Municipality (NDM) comprises an area of approximately 240km² which includes the following municipalities:

- a) Steve Tshwete Local Municipality;
- b) Emalahleni Local Municipality;
- c) Delmas Local Municipality;
- d) Thembisile Hani Local Municipality;
- e) Emakhazeni Local Municipality; and
- f) Dr JS Moroka Local Municipality.

7.1.1.2 Demographic Profile

7.1.1.2.1 Population

According to Stats SA (2011 Census) 395 466 people were recorded in 2011 – 30.2% of Nkangala's population. Population grew by 43.1% between 2001 & 2011 while annualized population growth rate was measured at 3.6%. 81.3% Africans, 15.7% Whites, 1.7% Coloured,

0.9% Asians and other 0.3%. Youth up to 34 years – 65.6% of municipality’s population. Number of households 119 874 (3.3 people per household) – 33.6% of Nkangala’s households.

Table 6: Population size and growth

Demographic Indicators	Stats SA Census 2001	Stats SA Census 2011	Share of Nkangala’s figure 2011	Share of Mpumalanga’s figure 2011	Ranking: highest (1)-lowest (18)
Population number	276 413	395 466	30.2%	9.8%	3
Number of Household	82 298	119 874	33.6%	11.1%	3
Area size (km ²)		2 677.67	16.0%	3.5%	13
Population (per km ²)		163			

Source: Census South Africa 2011

7.1.1.2.2 Economic Indicators

Contribution to Nkangala economy 38.7% - second largest of the 6 municipal areas. Dominant contributions especially in manufacturing (74.9%), Agriculture (42.8%), mining (40.6%) and finance (39.6%), to relevant district industries. Leading industries in terms of % contribution to Emakhazeni economy –mining (45.8%), manufacturing (17.2%), community services (9.4%), finance (8.7%), Trade (7.1%) and utilities (5.2%).

Table 7: Economic Indicators, contribution by Local Municipal Areas to Nkangala's industries

Industry	Victor Khanye	Emalahleni	Steve Tshwete	Emakhazeni	Thembisile Hani	JS Moroka	Nkangala
Agriculture	30.8%	13.0%	42.8%	6.8%	2.0%	4.6%	100.0%
Mining	2.4%	52.8%	40.6%	3.3%	0.8%	0.0%	100.0%
Manufacturing	1.4%	19.0%	74.9%	1.7%	2.4%	0.6%	100.0%
Utilities	0.3%	74.1%	20.9%	1.2%	1.9%	1.7%	100.0%
Construction	4.4%	52.5%	27.7%	3.9%	6.7%	4.8%	100.0%
Trade	5.8%	46.1%	26.0%	3.2%	14.7%	4.3%	100.0%
Transport	8.5%	48.3%	25.9%	9.9%	4.8%	2.6%	100.0%
Finance	5.1%	48.9%	39.6%	2.3%	2.3%	1.9%	100.0%
Community services	6.6%	34.5%	26.1%	3.6%	14.9%	14.3%	100.0%
Total	4.5%	45.2%	38.7%	3.5%	4.9%	3.2%	100.0%

7.1.1.2.3 Key Economic Activities

Emakhazeni Local Municipality economy is relatively and considerably diversified with three key production sectors mining, trade as well as community services contributing 55%. The average economic growth rate of Emakhazeni lies at 2.0% and this was measured between the period 1996 – 2015 and the forecasted average annual gross domestic product for 2015 – 2020 is a lowly 1.1% per annum.

According to latest report, the unemployment rate within the municipality decreased from 25.9% in 2011 to 23.8% in 2015. These figures means that the municipality's unemployment rate is the 7th lowest among all the municipal areas in Mpumalanga. However, it is noted with concern that the youth unemployment figure for the youth is 45.1%. This means that the municipality and private sector should strive to create initiatives directly addressing the youth's plight and this also includes skilling them in the areas that

respond to the main economic activities in the area. The municipality has therefore established a municipal entity known as “Emakhazeni Development Agency NPO” in order to address the above challenges. Primarily, the objectives of the entity are to take part in income generating activities which will enable it to be self-sufficient and fulfill the following

objectives:

- To provide economic and entrepreneurial advantages through alliances, associations and the sourcing and provision of opportunities for natural and juristics persons existing for the benefit of individuals from historically disadvantaged backgrounds within Emakhazeni Local Municipality;
- To offer financial assistance and bursaries to matriculants who completed their matric certificates from schools situated within Emakhazeni Local Municipality who wishes to pursue studies in tertiary education;
- Offer skills development courses programmes targeting the unemployed youth residents within the jurisdiction of Emakhazeni Local Municipality, and in fulfilling this objective the company may apply for accreditation as a training service provider with any recognized statutory body.

7.1.2 Regional and Local Geology

The project is located in the Bushveld Igneous Complex (BIC) which covers a pear-shaped area in the central Transvaal. It is divided into an eastern and western lobe, with a further northern extension. The BIC is estimated to have formed approximately 2,060 million years ago and its mafic rock sequence, the Rustenburg Layered Suite (RLS), is the world’s largest known mafic igneous layered intrusion containing approximately 90% of the world’s known Platinum Group Elements (PGE) reserves. In addition to the PGE’s, extensive deposits of iron, tin, chromium, titanium, vanadium, copper, nickel and cobalt also occur. The BIC extends approximately 450km east to west and approximately 250km north to south. It underlies an area of some 65,000 km², spanning parts of the Limpopo, Northwest, Gauteng and Mpumalanga Provinces.

The RLS is subdivided geographically into five discrete compartments termed “limbs”, three of which are being exploited for PGE’s. These are the Western, Eastern and Northern Limbs. The RLS comprises rock types ranging from dunite and pyroxenite through norite, gabbro and anorthosite to magnetite- and apatite-rich diorite, subdivided in terms of a mineralogically based, zonal stratigraphy into five principal zones. From bottom to top these are the Marginal, Lower, Critical, Main and Upper Zones. However, the

PGE bearing reefs are typically only 0.3m to 15m thick, although much greater thicknesses are recorded in the Platreef of the Northern Limb. In the Eastern and Western Limbs, the Critical Zone contains the two principal PGE-bearing reefs: the Merensky Reef and the Upper Group 2 (UG2) chromitite. In the Northern Limb, the Platreef is thought to be the local equivalent of the Critical Zone and Merensky Reef.

The Pilanesberg Complex, the remnant of an alkaline volcanic plug which intruded into the BC about 1,250 million years ago, splits the Western Limb into two lobes (northwestern and south-western) while the Eastern Limb is split into two lobes (north-eastern and south-eastern) by the Steelpoort Fault. The extrusions were emplaced over an early diabasic sill, outcrops of which are visible on the south-eastern side of the Complex. These are typically greenish in colour and composed of clinopyroxene, altered to hornblende and plagioclase, and are regarded as the earliest phase of the Complex. The ore bodies within the complex include the UG2 (Upper Group 2) reef containing up to 43.5% chromite, and the platinum-bearing horizons Merensky Reef and Plat Reef.

The Merensky Reef varies from 30 to 90 cm in thickness. It is a norite with extensive chromitite and sulfide layers or zones containing the ore. The Reef contains an average of 10 ppm platinum group metals in pyrrhotite, pentlandite, and pyrite as well as in rare platinum group minerals and alloys. The Merensky and UG-2 reefs contain approximately 90% of the world's known PGM reserves. About 80% of the platinum and 20% of the palladium mined each year are produced from these horizons. According to the geology and presumed outcrop of the area, the area granted has a very high likely hood of mineral occurrence of the BIC (which is namely Co, Cu, Ni, Ti, Fe, Cr and PGM) and very little probability of Gold (Au) ore to occur within this area.

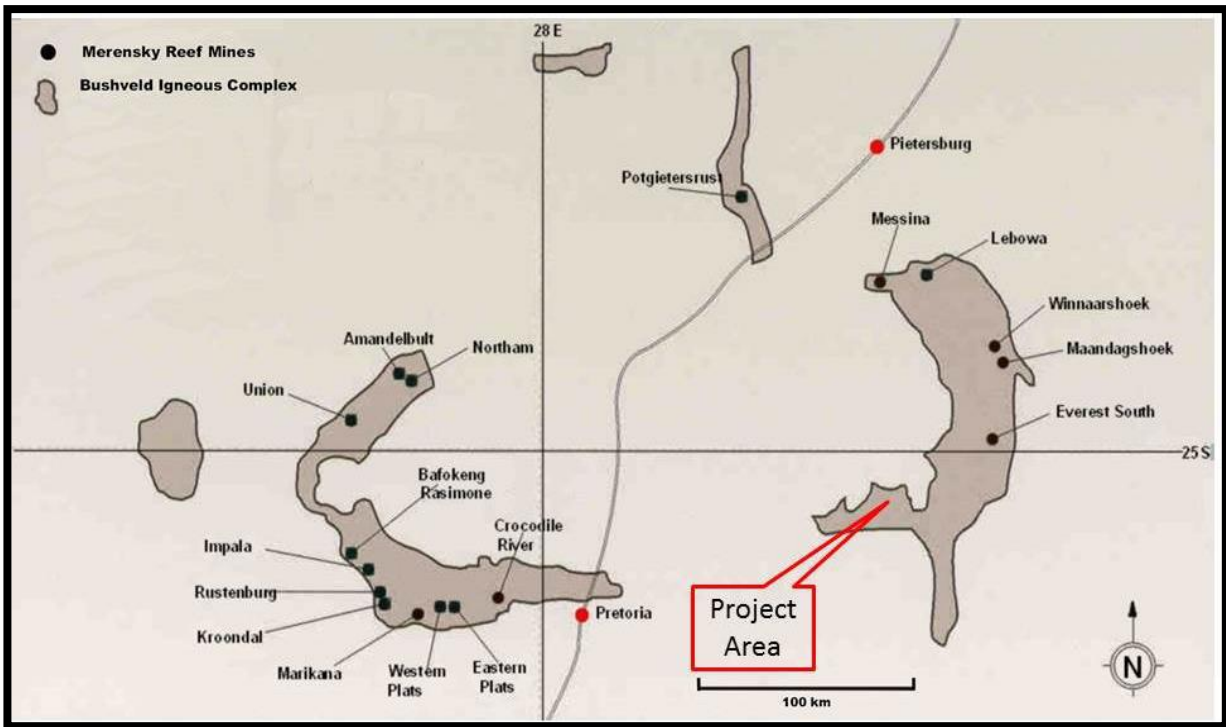


Figure 4: Bushveld Complex

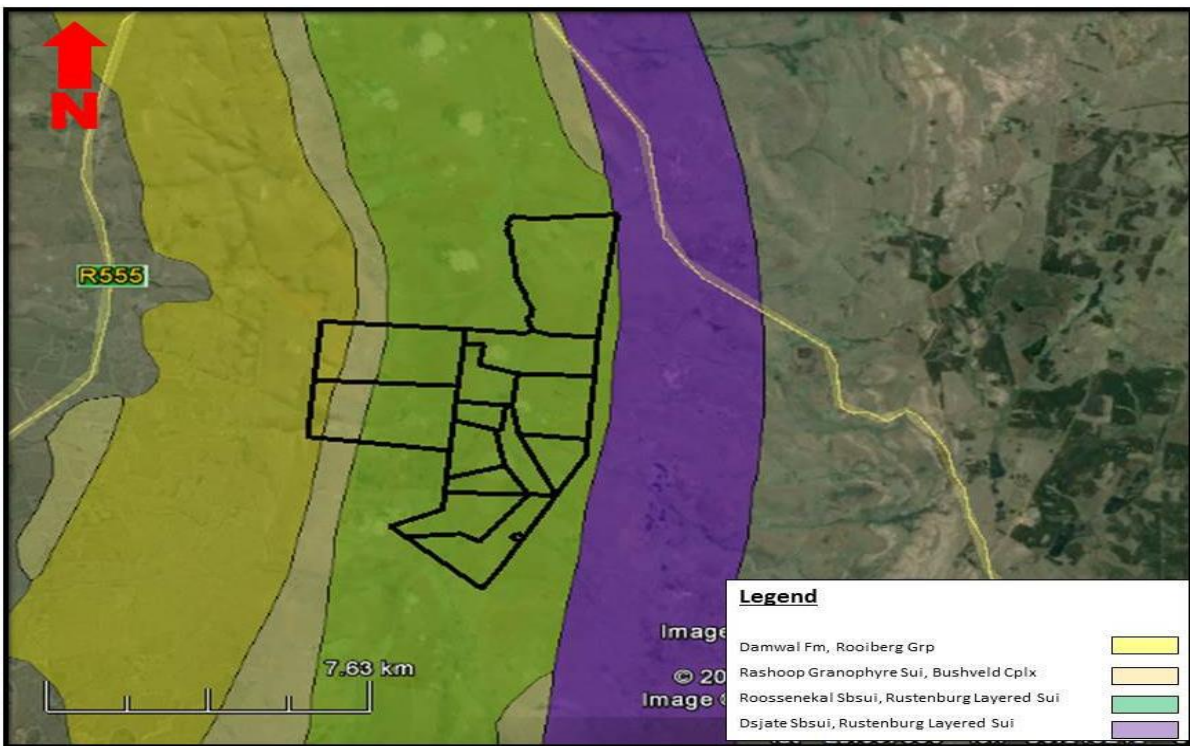


Figure 5: Geology of the area (modified from the google earth)

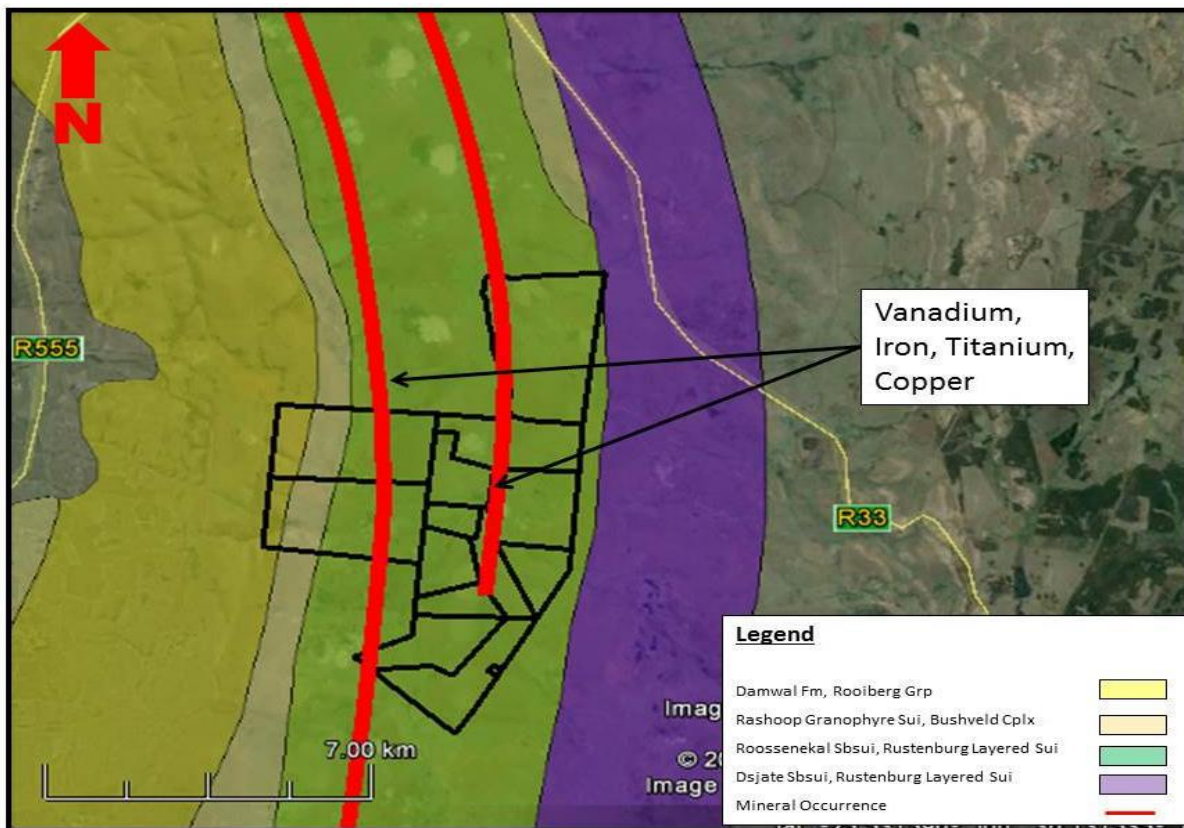


Figure 6: Mineral occurrence and geology

a) Climate and Precipitation

The area under investigation lies in the Transvaal Highveld in the sub-humid warm climatic zone, with annual maximum and minimum average temperatures of approximately 25°C and 10°C respectively. Belfast normally receives about 674mm of rain per year, with most rainfall occurring during summer. It receives the lowest rainfall (0mm) in June and the highest (128mm) in January. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Belfast range from 14.7°C in June to 22.5°C in January. The region is the coldest during June when the mercury drops to 1.3°C on average during the night.

b) Topography

The site is relatively flat with the site downwards slope towards the north-west direction and it is expected that storm-water drainage will be in the form of sheet-wash towards the same direction. There is an undulation due to upwards upliftment of the mountains on the western side of the area. The Steelpoort river cuts across the site in the middle on the area flowing in a north south direction. Eskom

electrical lines also traverse in the far western portion of the area in a north-south direction, with the railway lines following the same pattern.

7.1.3 Local Economic Development

At the core of Local Economic Development (LED) is the need to involve local people and institutions in the development of local economies by focusing on opportunities for economic growth, employment creation, through empowerment as well as social and economic transformation. LED is most importantly about people working together to achieve sustainable economic growth that brings economic benefits and quality of life improvements for all in the local community.

Each local municipality have their own LED goals and objectives which aim to address the needs of unemployment, poverty alleviation, improved investment, and business climate in the municipal area.

Since Kedjona Mining Mine will mainly operate within the Steve Tshwete Local Municipality, their objectives will guide the roll-out of LED projects for the receiving communities. The Steve Tshwete Local Municipality objectives for LED are summarised below.

- a) Through consultation with partners (government stakeholders, organized labour, industry associations and business chambers), develop long term master plans that promote external investors.
- b) Maximise the job creation potential of key sectors, through a partnership of local, provincial and national role-players.
- c) Retention of current investment and solicit future investment and growth through incentive packages (flexible tariff and rate structure, serviced land, stable supply of water and electricity, etc).
- d) Diversify and broadening key local sectors (steel manufacturing) through downstream beneficiation programs.
- e) Strengthening government- supported entities, increasing their capacity with a view of stimulating opportunities for small and medium enterprises in the manufacturing industry, particularly steel manufacturing.
- f) Make more land available for small and medium enterprises at the HEDC centre, show ground, and other available areas.

- g) Creating secondary industries out of the mining sector, e.g. recycling, cement manufacturing through mining bi-products or waste, processing of coal waste into secondary products (pellets, briquettes), identifying opportunities for quarrying, etc.
- h) Develop a coordination program (culminating into a structure) to facilitate the development of industry specific opportunities in conjunction with industry associations and business bodies.
- i) Continuous alignment of LED strategy to economic trends through the establishment of a panel of economic advisors to the Council.
- j) Coordinate all developmental issues as initiated by various government sector departments in the local municipality.
- k) Continuous improvement and updating of the investor guide incorporating new developments and economic opportunities.

Kedjona Mining will be guided by these objectives to promote LED within the community surrounding and in proximity to its operations. Kedjona Mining LED strategy will focus on creating enterprising opportunities for local communities that will eventually lead to the creation of sustainable livelihoods and social upliftment.

It is anticipated that Kedjona Mining activities will lead to an increase in social welfare and infrastructure in the Steve Tshwete Local Municipality. In close liaison with the Integrated Development Planning and LED Departments of the Steve Tshwete Local Municipality, Kedjona Mining will identify and invest in a number of LED projects as indicated in their SLP.

7.2 Description of the current land uses.

The land uses in the proposed site consist of crop farming and livestock farming.

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

The Steelpoort river cuts across the site in the middle on the area flowing in a north to south direction. Eskom electrical lines also traverse in the far western portion of the area in a north-south direction, with the railway lines following the same pattern.

7.2.2 Environmental and current land use map.

(Show all environmental, and current land use features)

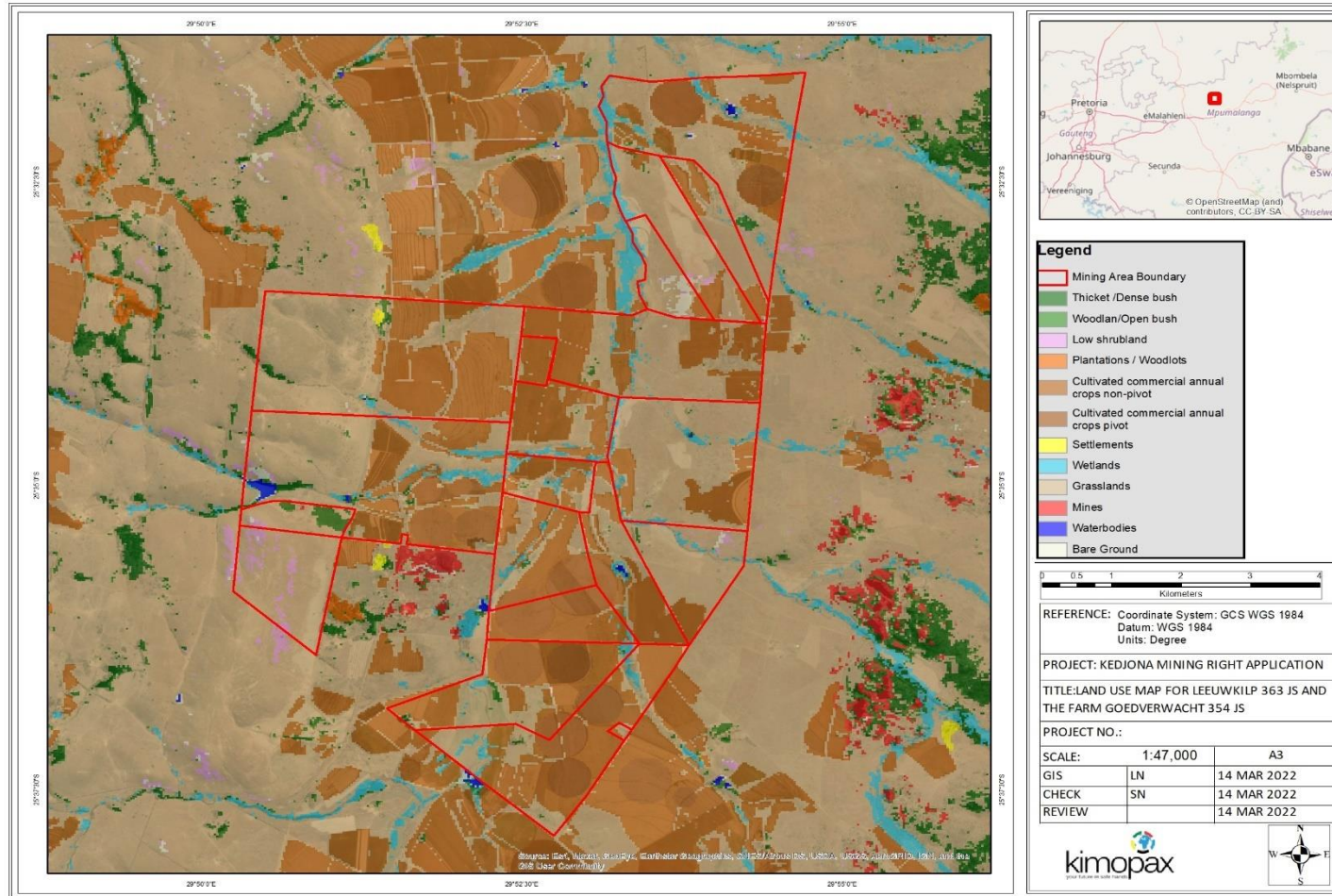


Figure 7: Land Use Map

8 Impacts Identified

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability and duration of the impacts

The Environmental Impact Assessment phase aims to identify the potential positive and negative biophysical, socio-economic and cultural impacts for the proposed project. Anticipated impacts that have been identified by the project team are indicated below. All impacts in terms of construction, operation and decommissioning together with their recommended mitigation measures will be and addressed in detail during the EIA/EMPr phase of the project.

- a) Geology;
- b) Topography;
- c) Air quality;
- d) Soil, land use and land capability;
- e) Biodiversity;
- f) Surface water;
- g) Noise;
- h) Climate Change;
- i) Hydrogeology;
- j) Blasting and Vibrations;
- k) Visual;
- l) Heritage;
- m) Socio-economic; and
- n) Traffic.

The potential impacts anticipated for the Project are discusses below.

Visual

The visual impacts will be due to the placement of temporary equipment and facilities on site as listed above in 6.5.2.1.2. However, the impacts of these structures/ activities relative to mining (and the others) are likely to have minimal impact. All trees surrounding mining area will be left *in situ*.

Topography

The operation of construction machinery and vehicles together with the storage of construction and hazardous materials is expected to have a minor negative impact on the topography. The addition or removal of any feature will impact on the surrounding topography. Vehicular activity to transport construction material could damage the surface of roads and impact on the topography. Piles of construction material will temporarily change the topography of the study area. The construction of surface infrastructure will add features to the topography thereby changing it.

Geology

The geology has been altered to a great extent due to historic mining activities in the area.

Soils

When topsoil is removed from a soil profile, the profile loses effective rooting depth which is one of the main criteria regarding capability classification. This area is already impacted upon; however some topsoil may be removed for the development of the infrastructure. During the construction of infrastructure and roads as well as vehicular activity, soil compaction could occur. This could lead to soil degradation and erosion. Hazardous materials used in the construction of infrastructure could cause soil pollution, should such materials be spilled.

Activities in the project area during the construction phase could lead to the following impacts on soils:

- a) Loss of topsoil as a resource;
- b) Soil compaction and erosion; and
- c) Hydrocarbon pollution.

Land capability

There will be no impacts during the construction phase of the project on the land capability of the project area.

Land use

The land Use of the project area will change from agricultural area to mining area.

Fauna and Flora

The removal of vegetation will have impact on the animals found in the area because one of the land uses in the project area is for grazing; there are cows that belong to the neighbouring community that feeds on the vegetation. No reptiles were found in the area and only a minimal number of bird species were

present. Due to this, the construction phase will have no impact on reptiles. The removal of large trees could destroy the bird nests and habitats, where present.

Surface water

There may be increased erosion potential and dust generation due to vegetation removal for construction of infrastructure and vehicular activity. This may cause siltation that would reduce the quality of the surface water runoff. There may also be consequent contamination of water by the mining material that could be introduced into the water. This will however be minimised by clean and dirty water separation implemented by Kedjona Mining and Exploration Pty Ltd as required by law. Spillages of hazardous material on site could contaminate the storm water run-off thereby reducing the quality of clean water reporting to the catchment. This needs to be captured and not allowed offsite.

Ground water

Spillage of diesel, oil and lubricants from the vehicles used for construction can occur should there be any breakdowns or accidents. Infiltration of the spilled substances may reach the groundwater table, thus polluting the shallow aquifer. No significant impact on the groundwater during the construction.

Noise

Noise will be generated due to construction activities. The construction vehicles moving to and from the site may impact on the ambient noise levels at the surrounding residential areas, but the duration thereof will be short term.

Air quality

Removal of the vegetation from the mining site will result in potential increase in dust emissions in the surrounding areas as a consequence of soil disturbance as well as when wind blows over the area that has been stripped of vegetation. Movement of construction vehicles, combined with the removal of vegetation, will result in an increase in dust levels on and around the site.

Socio-economic

Employment/Job creation

There is likely to be local job opportunities that are expected to result from the commissioning of other operations in the area, due to the presence of the mining activities. It is anticipated that a fairly large

proportion of the construction workforce will be derived from within the borders of the Nkangala District, dependant on the availability of necessary skills. Limited employment opportunities will be created, slightly increasing the level of income which could result in a positive impact on the local economy. This is likely to be short-term employment. There is the potential for a slight increase in local population due to the influx of jobseekers which could put more pressure on local infrastructure and services.

Improved road facilities and accessibility

During construction, surrounding roads are likely to be upgraded (dependent on the requirements of the construction activities) to provide access to the mine site for construction vehicles and machinery. Although not an intended purpose, this may result in improved access routes for local residents. This impact will only be prevalent where the placement of these roads is deemed beneficial to local residents. Similarly, if these roads are deemed to be beneficial to residents, the impacts will only be realised if access to these roads is allowed. Should access be permitted (assuming safety considerations have been taken into account), and dependent on the routing of the roads, neighbouring residents may benefit from reduced travelling time, shorter distances, lower transport costs and better access to services such as schools, shops and other amenities.

Health and Safety

Construction and operation activities are likely to result in an increase in traffic volumes on certain roads in the vicinity. This could lead to damage of roads and increased speeding through residential areas, thereby impacting on the safety of residents in surrounding communities.

Other safety-related risks associated with the proposed project include the following:

- a) **Noise impacts:** Those living in the vicinity of the project may be affected by noise levels associated with traffic and the reclamation activities;
- b) **Unauthorised access:** If members of surrounding communities gain unauthorised access to the project site, they could be at risk of injury;
- c) **Hazardous material:** If hazardous material is stored on site there is a risk of this being stolen and could be exposed to the greater community.
- d) **Air quality and dust:** The mining activities could temporarily increase the amount of dust in the environment which could negatively affect respiratory health to those who inhale the dust. This will be mitigated by the fact that the mining method is a wet process; additional mitigation methods should be added;

9 EIA PROCESS AND METHODOLOGY

The EIA process and methodology that was followed during the scoping phase was based on the best practise guidelines and the requirements of the NEMA and MPRDA. The approach used comprised of the following:

- a) A gap analysis of existing studies that were done in the same area by different consultants
- b) Project definition and the analysis of alternatives which involved data review and sensitivity mapping and also the analysis of identified alternatives
- c) Screening which involved the review of identified environmental, water and mining legislation applicable to the study
- d) Site visit to collect baseline information on the environmental conditions that could be affected by the mine
- e) Public Participation was done throughout the whole scoping phase to capture comments that were raised by different communities. Issues raised were also used to formulate terms of references for other specialist studies.

During the EIA phase, the following activities were done:

- a) Integrating of specialist reports into the EIA focusing mainly on the specialist findings, identified impacts mitigatory measures and recommendations.
- b) Preparation of the EIR/EMPr Report which will present all the findings of the impact assessment. Report will be distributed for public participation.
- c) Public participation will continue throughout the EIA phase to ensure that comments and issues raised by communities are addressed.

9.1 Scoping Methodology

Scoping phase methodology comprised of the following:

- a) Pre-application meetings were held with communities
- b) Submission of EA application form after pre-application public participation
- c) Site visit to establish baseline environmental conditions on site
- d) Literature review of previous studies done in the study area
- e) Public participation to capture and address comments and issues raised by the community.

- f) Distribution of the draft report for public to review
- g) Compilation and submission of the final scoping report

9.2 Impact Assessment Methodology

Impact significance of each identified impact was determined using the methodology explained in **Table 8**

Table 8: Methodology to determine the extent of the impact

PARAMETERS	DESCRIPTIONS
Extent	Refers to the physical or geographical size that is affected by the impact. It can be categorised into the following ranges: a) Onsite – Within specific site boundary (weight value – 1) b) Local – Within municipal boundary (weight value – 2) c) Regional – Outside municipal boundary (weight value – 3)
Duration	Time span associated with impact: a) Short term – 1 Year or less (weight value – 1) b) Medium term – 1-5 Years (weight value -2) c) Long term – Longer than 5 Years (weight value – 3)
Intensity and reversibility	The severity of an impact on the receiving environment: a) Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1) b) Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2) c) High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3)
Impact Significance/Consequence	Adding the extent, duration and intensity together provides the significance of the impact (High, Medium or Low). Extent + Duration + Intensity = High/Medium/Low Impact

PARAMETERS	DESCRIPTIONS			
Probability	The likelihood of an impact occurring: a) Unlikely – 0% - 45% chance of the potential impact occurring (weight value – 1) b) Possible – 46% - 75% chance of the potential impact occurring (weight value – 2) c) Likely - >75% chance of the potential impact occurring (weight value – 3)			
Environmental Risk Refer to table below	Multiplication of the significance of the impact by the probability of the impact occurring produces a final conclusion of the overall risk that an impact poses to the surrounding environment. High/Medium/Low Impact X Probability = High/Medium/Low Environmental Risk			
Risk Assessment Matrix				
	Low Impact (1 -5)	Medium (6-8)	High Impact (9)	
Probability	Definite/Very Likely (3)	9 - 15 L-M	18-24 M-H	27 H
	Possible (2)	6-10 L-M	12-16 M	18 M-H
	Unlikely (1)	3-5 L	6-8 L	9 L
ENVIRONMENTAL RISK	Guidelines for Control Strategies			
(H)-High	Proactively reduced risk level, short term response			
(M-H) -Medium High	Proactively reduce risk level, short term response			
(M)-Medium	Management strategies to reduce risk level, short to medium term response			
(L-M) Low -Medium	Management strategies to reduce risk level, short to medium term response, operational control and housekeeping			
(L) Low	Operational Control			

9.3 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.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Table 9: Positive and Negative impact of the proposed activity

Alternative		Advantages	Disadvantages
Activity alternatives (mining method alternatives)	Preferred Alternative (Opencast mining methods)	The shallow nature of : Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM). deposit can easily be mined by means of opencast mining. Economically and socially empowerment of the local communities	Opencast mining methods may result in direct and indirect impacts on several aspects of the environment including: Soil (compaction), flora (clearance and dust), fauna (habitat destruction, noise), air quality (dust, vehicle emissions), noise (animal life and surrounding communities), and surface- and groundwater (spillages, inadequate separation of clean and dirty water, potential leaching of water)
	Alternative 1 (Underground mining method)	In comparison to the preferred alternative, if underground mining would have been feasible, there could be less surface-related environmental impacts that would have resulted from mining.	Underground mining has greater safety risk to the miners as compared to the open cast mining method. Owing to the shallow nature of the proposed minerals, it is not feasible to undertake underground mining.
No-go versus Open cast mining	Open cast Mining	Mining activity was preferred on the proposed site based on the availability of : Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM). reserves within the area. The open cast mining is preferred such that the shallow	Visual impacts The development of the mine will have a visual impact on the proposed area due to the dust generation and construction activities resulting from the mining activities. Dust

Alternative		Advantages	Disadvantages
		<p>nature of the mineral deposit can easily be mined by means of opencast mining.</p> <p>If the mining right is granted local communities will be positively impacted through employment opportunities that will arise and the proposed area's economy will grow through trading activities associated with mining activities like transport, increase in health facilities as well as an increased turnover in hospitality and tourism sectors.</p> <p>Most importantly, the proposed mining project will create skills development and community building opportunities to the local community, therefore, eradicating poverty in such a case stimulating Local Economic Development.</p> <p>Not only that, the business opportunities will be encouraged through infrastructural development as roads will be constructed, this will assist in</p>	<p>The excavation activities and the use of the access dusty roads will result in the emission of dust into the surrounding atmosphere. This will not only impact on the surrounding communities but also the plants surrounding the area as the dust is deposited on the leaves. This interferes with the photosynthesis process of the plants. Furthermore, animals that feed on the plants will be impacted upon as this will affect their forage.</p> <p>Noise</p> <p>Noise pollution will be generated from the mining activities, namely through the movement of trucks and vehicles, machinery operations, trenching activities. Depending on the size, noise levels of the trucks and excavators may cause the noise to be localised in the specific site.</p> <p>Soil contamination</p> <p>Soil pollution due to the leakages of oil and other industrial liquids from the trucks and machinery. This is a potential risk of soil contamination, which will change the soil chemistry and soil</p>

Alternative		Advantages	Disadvantages
		<p>increasing the demand of goods and services in the affected area/s in the long term.</p> <p>The project will contribute directly and indirectly to the Country's GDP.</p> <p>Moreover, the development will encourage income generation in the area as well as the development of BEE opportunities during construction, operation and eventual closure and rehabilitation</p>	<p>nutrients of the affected soil. Ultimately this could also potentially affect the vegetation growth in the contaminated areas.</p> <p>Impact on heritage resources</p> <p>The mining activity could result in danger of negatively impacting on unidentified heritage resources during site assessment, however, the possibility of the impact is very minimal as education and training on heritage resources will be given to mine employees.</p> <p>Fauna disruption</p> <p>Due to the impacts of noise, dust, movement and operation of trucks and vehicles, the potential loitering of the employees and the trenching itself will disrupt the surrounding animals. This disruption can further lead to injury or death in cases where animals fall into the trenches.</p> <p>Stripping (Removal of vegetation)</p> <p>While all means will be applied to minimise disturbance, removal of vegetation cannot be avoided altogether. Deforestation will occur to</p>

Alternative		Advantages	Disadvantages
			<p>clear the land for the opencast mining, this will leave the ground bare and prone to erosion.</p> <p>Soil erosion</p> <p>Erosion of the soil will occur through runoff and wind.</p> <p>Habitat destruction</p> <p>The habitat that supports the animals within the project site will be disturbed and destructed by the movement and operations during the mining activities. This could possibly cause the relocation of some of the animals and result in habitat fragmentation.</p> <p>Waste generation</p> <p>Waste rock, litter and other solid waste will be generated and deposited in and around the site. This could potentially attract nuisance and affect the natural scenery of the site. Waste rock will be used to backfill the trenches. This will be undertaken in a concurrent rehabilitation manner.</p>

Alternative		Advantages	Disadvantages
			<p>Surface and groundwater impacts</p> <p>The hazardous chemical spills may lead to surface water contamination and groundwater due to the leakages.</p>
	No-go Alternative	The implementation of the no-go option would result in the continuation of the current land uses (farming). Therefore, no additional impacts on the bio-physical environment will occur, besides those that are currently occurring, and / or which may potentially occur if the areas are not managed appropriately.	It is also very important to note that the implementation of the no-go option may not necessarily prevent the mining of these resources on the property, as other companies may apply to mine the resources, unless the DMR sterilizes the reserves.
Preferred Layout (No Layout Alternative was identified)	The Layout plan presented in Error! Reference source not found.	The site was selected based on the geographic position of the potential underlying required : Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM) reserves, ease of operations and mining activities on site as well as minimal disturbance to the community near the site.	No disadvantages have been identified presently
Technology Preferred (No technology)	Excavators, apron feeders, bulldozers, trucks, bowl scraper,	The technologies have long-term success in terms of mining history. According to Mclanahan (2018), due to their long service life with low-maintenance	No disadvantages have been identified presently

Alternative		Advantages	Disadvantages
Alternative was identified).	crushers, conveyors and shovels	applications, apron feeders are a popular feeder choice	
Operation Preferred Operation Alternative was identified)	(No The operation includes the open cast mining, the processing plant, pollution control dams, workshops, material stockpiles, storage, excavations, access roads diesel and wash bays	The mine and its related activities will generate employment opportunities.	Relocation and loss of cattle grazing area for the herders at the Cattle post, overcrowding of the area in search of greener pastures.

9.4 The Possible Mitigation Measures and the Level of Risk.

a) Air Quality

The main impacts on air quality will be from material handling (soil, waste rock, ore), vehicle entrainment from unpaved roads and from conveyors. Proposed mitigation measures that will be employed include drop height reduction, avoidance of temporary storage piles, covering and/or enclosure of all transfer points and wet suppression. The main aim will be to maintain low dust concentrations

b) Terrestrial Ecology

Common impacts will comprise of vegetation clearance, habitat destruction, encroachment of alien invasive plant species and loss of species of conservation concern. Implementation of alien invasive plant management plan during decommissioning to prevent the growth of invasive plants on rehabilitated areas to a low level and the rehabilitation of site with indigenous vegetation that occurs in the vicinity of the project area. This will help restore the site to its pre-mining condition

c) Groundwater

Pit dewatering and groundwater contamination from hydrocarbon spillages and decant during post-closure will have a significant impact if not managed. The following mitigation measures if implemented, will result in a low impact:

- Store the dewatered water in PCDs and ensure that the dams will have enough storage volume
- If that is not possible, re-introduce treated water into the streams after ensuring that they meet the required standards as per the WUL or river quality objectives
- Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users
- Monitoring of groundwater water levels and groundwater inflow rates
- Monitoring groundwater levels, decant rates and qualities

d) Surface Water

There are Steelpoort, Grootspuit and Langspruit rivers which cut across the project area. These perennial rivers will be affected within the study area where the mine and infrastructure will be located. The pit and mine infrastructure area will be demarcated in approximately 100m from the rivers. However, the possibility of surface water contamination will result due to:

- Clearing the surface and site preparations, for the mine infrastructure will result in exposure of soil surfaces to erosion factors. When a large area of vegetation is cleared and topsoil disturbed, exposing a large area of loose material, susceptible to erosion. During rainfall events, runoff from the exposed site will transport the eroded soil material into the nearby watercourses.
- Uncontrolled spills of contaminants such as fuel and oils, and subsequent washing away of these into the surface water resources

This will be reduced to a lower level if the following measures are implemented:

- Waste storage facilities should be on a hard parked, roofed and bunded facility.
- Storm water management measures such as diversion berms, trenches and PCDs should be monitored and maintained fairly regularly.
- Prevent and contain hydrocarbon spillages that may wash off into nearby watercourses

e) Soil, land use and land capability

Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localised within the site boundary and have medium-high significance on the soil resource. Another major impact will be soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). Impact significant will be lower if the following measures are implemented:

- Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation
- To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum
- A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled

f) Noise

The vibration and over-air pressure levels during blasting will result in an increase in the prevailing noise level when blasting take place. The same physical attributes such as distance, topography and wind direction will play a role on how the receptors will perceive the over-air pressure and ground vibration

levels which last for up to 3-seconds per blast. The risk level of noise will be medium to members of the public who will be exposed. Proposed mitigation measures will involve the following:

- Regular noise monitoring on site and the surrounding areas
- Locating topsoil and overburden stockpiles to act as acoustic barriers between the opencast mine and receptors where practical; and
- Enclosing noisy equipment, such as crushers, in buildings clad with sound-absorbing materials where necessary.

g) Heritage and Cultural Aspects

The Phase I Archaeological and Cultural Heritage Impact Assessment for the proposed mining right of Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM) will be conducted in order to identify the significant impacts to archaeological or grave resources that will need to be mitigated prior construction. Despite that there may be no archaeological objects observed during the survey, and that the area is disturbed due to agricultural activities, the client must know that unavailability of archaeological material does not mean absentee, archaeological material might be hidden underground. It is thus the responsibility of the developer to notify contractors and workers about archaeological material (e.g., pottery, stone tools, remnants of stonewalling, graves, etc) and fossils that may be located underground to keep the impact low. Furthermore, the client is reminded to take precautions during construction.

9.5 Site Selection Matrix and Final Site Layout

9.5.1 Mining Layout

The layout of the opencast mining areas and the infrastructure areas is dictated by the mining costs, which are in turn determined by the thickness of the overburden, the depth and grade of the ore, the ratio of waste rock to ore and the mining equipment chosen. The in-pit haul roads will move around as the pit geometry develops, but the locations of the exterior haul roads are dictated by the perimeter of the final open pits. Topsoil and overburden berms will be constructed between the perimeter of the open pits and adjacent public roads.

9.5.2 Motivation where no Alternative sites were considered

The pit site for the proposed open-cast mining operations was selected based on availability of Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM) reserves to be mined. Minerals can only be mined where there are identified and verified, therefore it was not practical to select any other sites. The No-Go option is the only other alternative identified during the Scoping phase. If the proposed operation were not to proceed, the land may or may not be utilized for agricultural, or grazing activities in the future. It is worth noting that as much as the no go option may result in the protection of the environment in situ; the consequences of not proceeding with the proposed operation will include the forfeiture of a mining opportunity and therefore the loss of support towards the Emakhazeni local municipality. It would further suggest that no new employment opportunities would be created as well as any resultant community upliftment and development programs would likely take place in the surrounding communities.

If an alternative resource cannot be identified, this will limit the development of the proposed mine. The site is therefore regarded as the preferred site, and alternative sites are not considered

9.5.3 Statement Motivating the Preferred Sites.

(Provide a statement motivation the final site layout that is proposed)

The location of the proposed mining activity was influenced by the following factors;

- a) Availability of the Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM);
- b) Land ownership.
- c) Geo-hydrological impacts; and
- d) Available transport modes and routes.

The proposed layout is, therefore, the most suitable and economically/environmental viable option for the open pit mining

10 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objectives of the EIA process are to understand the consequence of these potential impacts and to determine to what extent they can be minimised. Based on experience with past studies on similar mining operations, supported by site-specific specialist studies, it should be possible to predict the impacts on noise, heritage, soils, surface water, groundwater, air quality, the ecology and the local socio-economic and to formulate appropriate mitigation measures.

10.1. Project Phases

The environmental impacts of the project were considered and assessed for the following phases:

- a) Construction;
- b) Operational; and
- c) Closure and rehabilitation

10.1.1 Construction Phase

The construction phase will comprise of the following:

- a) Site survey and putting up pegs to mark the mine and infrastructure footprint
- b) Vegetation clearing within the footprint
- c) Construction of stormwater facilities
- d) Construction of mine infrastructure (workshops, PCDs, office buildings and plant area)
- e) Demarcate mining area and topsoil, overburden and waste rock storage areas

10.1.2 Operational Phase (Mining Phase)

Activities will include the following:

- a) Stripping and stockpiling of topsoil and overburden ahead of pit opening
- b) Drilling and blasting
- c) Open cast mining of the ore
- d) Transportation of the mined ore to the processing plant

- e) Crushing, and screening of the ROM
- f) Transportation of processed product off-site
- g) Equipment and vehicle maintenance at the mine workshop

10.1.3 Closure and Rehabilitation

Activities of closure and rehabilitation will involve:

- a) Dismantling of the ore processing plant and removal of all metal structures;
- b) Demolition of buildings and other infrastructure and disposal of the rubble;
- c) Shaping of waste rock dump
- d) Emptying and backfilling of PCDs
- e) Revegetating the backfilled areas
- f) Post-closure monitoring of surface water, groundwater and vegetation

10.2 Air Quality

With regards to health effects, the World Health Organisation (WHO) confirms that particulate air pollution is often associated with complaints of the respiratory system (WHO, 2000). PM size is relevant in terms of health as it is responsible for where in the respiratory system a given particle is deposited. There are an increasing number of research studies highlighting the impact of gases and air pollutants on humans. Many of these emissions, even in small quantities, have adverse effects on workers and neighbouring residents alike.

Particles can be classified by their aerodynamic properties into coarse particles, PM₁₀ and fine particles, PM_{2.5} (Harrison & Van Grieken, 1998). The fine particles contain the secondarily formed aerosols such as sulphates and nitrates, combustion particles and re-condensed organic and metal vapours. The coarse particles contain earth crust materials and fugitive dust from roads and industries (Fenger, 2002).

In terms of health effects, particulate air pollution is associated with respiratory and cardiovascular morbidity, such as aggravation of asthma, respiratory symptoms and an increase in hospital admissions. Inhalable PM also leads to increased mortality from cardiovascular and respiratory diseases and from lung cancer (WHO, 2013). Particle size is important for health because it controls wherein the respiratory system a given particle is deposited. Fine particles are thought to be more damaging to human health than

coarse particles, as they are able to penetrate deeper into the lungs (Manahan, 1991). Larger particles are deposited into the extrathoracic part of the respiratory tract, while smaller particles are deposited into the smaller airways leading to the respiratory bronchioles (WHO, 2000).

In the past, daily particulate concentrations were in the range 100 to 1000 $\mu\text{g}/\text{m}^3$ whereas, in more recent times, daily concentrations are between 10 and 100 $\mu\text{g}/\text{m}^3$. Overall, exposure-response can be described as curvilinear, with small absolute changes in exposure at the low end of the curve having similar effects on mortality to large absolute changes at the high end (WHO, 2000). Both short-term and long-term exposure to particulate matter in the air can have health impacts (Table 10).

Table 10: Short-term and long-term health effects associated with exposure to PM (WHO, 2004)

Pollutant	Short-term exposure	Long-term exposure
Particulate matter	Lung inflammatory reactions	Increase in lower respiratory symptoms
	Respiratory symptoms	Reduction in lung function in children
	Adverse effects on the cardiovascular system	Increase in chronic obstructive pulmonary disease
	Increase in medication usage	Reduction in lung function in adults
	Increase in hospital admissions	Reduction in life expectancy
	Increase in mortality	Reduction in lung function development

10.2.1 Impact Assessment

Table 11: Air quality impacts assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction			
Vegetation clearing	Dust emissions due to the erosion of open storage piles and exposed areas occur when the threshold wind speed is exceeded (Cowherd, Muleski, & Kinsey, 1988; US EPA, 1995).	<ul style="list-style-type: none"> a) Wet suppression, applied sparingly, to ensure the absence of visible dust; b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-ASide may also be used; c) Enforce low vehicle speeds on unpaved areas (< 40 km/h); d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; e) Vegetate the berm and other surfaces that were laid bare as a result of construction 	Medium

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<p>with locally indigenous grass species where practicable, as soon as possible; and</p> <p>f) Requiring contractors to maintain construction vehicles in good condition</p>	
Vehicle movement on haul roads	Same as above	<p>Haul road mitigation measures include:</p> <p>a) Tarring or paving, wet suppression and chemical surface treatments.</p> <p>b) Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions.</p> <p>c) Other surface treatments include the use of chemicals such as calcium chloride or magnesium chloride. These chemicals attract moisture – drawing moisture out of the air during periods of high humidity, and also</p>	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		reducing the evaporation rate of water during hot periods.	
Operational			
Drilling and Blasting	Emissions from drilling are a relatively minor component of the overall emission from an open pit mine. The only available emission factor for drilling is a simple uncontrolled TSP emission factor of 0.59kg/hole for overburden	<ul style="list-style-type: none"> a) Efficiency will be applied to reduce wastage and unnecessary fuel consumption; b) Carbon offsets will be considered if required; c) Concurrent best practice rehabilitation and vegetation monitoring will be applied to allow for the restoration of some the carbon sink functionality within the mining right area. d) Avoid blasting under windy conditions as far as practicable 	Low
Processing Plant	The moisture content of the material processed can have a substantial effect on emissions	Surface wetness causes fine particles to agglomerate on, or to adhere to, the faces of larger chunks of ore, with a resulting dust suppression effect. However, as new fine particles are created by crushing and attrition, and as the moisture content is reduced by	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		evaporation, this suppressive effect diminishes and may disappear	
Vehicle Movement	Vehicle entrainment from unpaved roads	<ul style="list-style-type: none"> a) Enforcement of a 40 km/hour speed restriction on unpaved haul roads; b) Wet suppression on haul roads, with the addition of a chemical binder if necessary 	Medium
Crushing and screening	Crushing and screening operations represent significant dust-generating sources if uncontrolled. The large percentage of fines in this dustfall material enhances the potential for it to become airborne. It was assumed that primary crushing (crushing to achieve particles of <300 mm) will take place in the pit to reduce the ore to a transportable size for the conveyor system.	Wet suppression will be used for both the secondary and tertiary crushing stages	Low
Materials handling	Materials handling operations which are predicted to result in significant fugitive dust emissions from mining operations include the transfer of material by	<ul style="list-style-type: none"> a) Reduced tipping and drop heights where practicable; 	Medium

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	means of loading and offloading of trucks, loading and offloading conveyors, transfer from one conveyor to another and bulldozing. The quantity of dust which will be generated will depend on various non-climatic parameters such as the nature (moisture content and silt content) and volume of the material handled.	<ul style="list-style-type: none"> b) Regular clean-up at loading areas and on paved surfaces to prevent entrainment by wind or vehicles; c) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Covering of exposed areas with coarsely crushed rock or aggregate material where practicable; e) Maintaining all vehicles in good condition at all times; and f) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS 	
Decommissioning and Rehabilitation			
Demolition of infrastructure	Particulate mobilisation can be caused by the demolition of buildings and handling of the rubble,	a) Wet suppression during landscaping and materials handling activities;	Medium

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	backfilling of the storm water dam and “dirty” water collection channels and ripping and shaping of compacted areas	<ul style="list-style-type: none"> b) Enforcement of low vehicle speeds on unpaved areas (< 40 km/h); c) Use of shade-cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Vegetation of bare surfaces with locally indigenous grass species as soon as possible; e) Continue dust fall monitoring until vegetation cover is well established; and f) Requiring contractors to maintain construction vehicles in good condition 	

10.3 Noise Impact

The World Bank in the Environmental Health and Safety Guidelines has laid down the following noise level guidelines:

- a) Residential area – 55.0dBA for the daytime and 45.0dBA for the night-time period; and
- b) Industrial area – 70.0dBA for the day- and night-time periods.

The difference between the actual noise and the ambient noise level and the time of the day and the duration of the activity, will determine how people will respond to sound and what the noise impact will be. In order to evaluate such, there must be uniform guidelines to evaluate each scenario. SANS 10103 of 2008 has laid down sound pressure levels for specific districts and has provided the following continuous noise levels per district as given in Table 12 (Van der Merwe, 2019).

Table 12: Recommended noise levels for different districts

Type of district	Equivalent continuous rating level ($L_{Req,T}$) for ambient noise - dBA					
	Outdoors			Indoors, with open windows		
	Day-night $L_{R,dn}$	Daytime $L_{Req,d}$	Night-time $L_{Req,n}$	Day-night $L_{R,dn}$	Daytime $L_{Req,d}$	Night-time $L_{Req,n}$
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with some workshops, with business premises and with main roads	60	60	50	50	50	40
e) Central business district	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

For industrial districts, the $L_{R,dn}$ concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24h day/night cycle, $L_{Req,d} = L_{Req,n} = 70\text{dBA}$ can be considered as typical and normal.

Table 13: Sound pressure levels of construction machinery

Equipment	Reduction in the noise level some distance from the source - dBA								
	2m from the machinery and/or equipment	15m	30m	60m	120m	240m	480m	960m	1920m
Cumulative distance from source in meters									
Dump truck	91.0	62.5	56.5	50.4	44.4	38.4	32.4	26.4	20.3
Backhoe	85.0	56.5	50.5	44.4	38.4	32.4	26.4	20.4	14.3
Drilling Equipment	100.0	71.5	65.5	59.4	53.4	47.4	41.4	35.4	29.3
Flatbed truck	85.0	56.5	50.5	44.4	38.4	32.4	26.4	20.4	14.3
Pickup truck	70.0	41.5	35.5	29.4	23.4	17.4	11.4	5.4	-0.7
Tractor trailer	85.0	56.5	50.5	44.4	38.4	32.4	26.4	20.4	14.3
Crane	85.0	56.5	50.5	44.4	38.4	32.4	26.4	20.4	14.3
Pumps	70.0	41.5	35.5	29.4	23.4	17.4	11.4	5.4	-0.7
Welding Machine	72.0	43.5	37.5	31.4	25.4	19.4	13.4	7.4	1.3
Generator	90.0	61.5	55.5	49.4	43.4	37.4	31.4	25.4	19.3
Compressor	85.0	56.5	50.5	44.4	38.4	32.4	26.4	20.4	14.3
Pile driver	100.0	71.5	65.5	59.4	53.4	47.4	41.4	35.4	29.3
Jackhammer	90.0	61.5	55.5	49.4	43.4	37.4	31.4	25.4	19.3
Rock drills	100.0	71.5	65.5	59.4	53.4	47.4	41.4	35.4	29.3
Pneumatic tools	85.0	56.5	50.5	44.4	38.4	32.4	26.4	20.4	14.3
Cumulative noise levels from the construction activities when all of such work within a radius of 30m	105.5	76.9	70.9	64.9	58.9	52.9	46.8	40.8	34.8

Source: (Van der Merwe, 2019)

The noise reduction calculated in Table 13 is for direct line of sight and medium ground conditions. Engineering control measures and topography can have an influence on how the noise level is perceived by the occupants of nearby noise sensitive areas. The cumulative noise level of the machinery and equipment will be 64.9dBA at 60m and 40.8dBA at 960m from the construction area if all the machinery operates in a radius of 30m at one time. This will seldom happen, and the cumulative noise level will therefore be lower.

10.3.1 Impact Assessment

Table 14: Noise impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation	
Construction Phase				
Site clearing	Clearing and stripping of topsoil and vegetation	Earthwork activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	Low	
	Construction of mine infrastructure	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	Low	
Operational Phase				
Operation of processing plant	Noise increase at the boundary of the mine footprint and at the abutting residential	a) All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off. b) Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the boundaries of the plant have not changed.	Medium	
Pit activities			Speed limit of mining areas to be adhered to at all times.	
Hauling of waste rock to the waste dump				
Hauling of material to the plant				
Additional traffic			Low	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Operation of an emergency generator		Noise readings to be done in the vicinity of and along the emergency boundaries to ensure that the prevailing ambient noise level is not exceeded.	Medium
Decommissioning Phase			
Planting of grass and vegetation at rehabilitated area	Noise increase at the boundary of the mine footprint and at the abutting residential	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	Low
Maintenance of disturbed area		Maintenance activities to be done during daytime working hours.	Low

10.4 Traffic Impact

10.4.1 Mine Operations Traffic

10.4.1.1 Employee Traffic

It is estimated that once fully developed, the mine will employ approximately 300 workers, most of them will be from the surrounding areas. The mine will provide transportation through provision of buses to ferry the workers for the different shifts. Although the mine will operate in shifts in order to model the worst-case scenario Table 15 models all the employees arriving in the AM peak hour and departing in the PM peak hour.

Table 15: Employee trip generation

	Number		Split	Vehicles
Employees	194		Buses	3
	50		Walk/Cycle	-
	56		Cars	56
Expected total trips			Total number of expected vehicle cars	59 trips
Directional split 90:10 AM	IN	OUT		
	53	6		
Directional split 10:90 PM	IN	OUT		
	6	53		

Table 16: Haulage trips

Directional split				Number of trucks
Directional split 50:50 AM	IN	OUT	Total peak hour trips	16
	8	8		
Directional split 50:50 PM	IN	OUT	Total peak hour trips	16
	8	8		

The trip calculation in Table 15 and Table 16 above assumes that all these trips happen within the typical peak hour duration, so as to model the worst case scenarios however as clearly set out the mine will operate under 3 different shifts starting as early as 0500hrs which falls outside the typical peak hour.

10.4.2 Impact Assessment

Table 17: Traffic impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Transportation of materials and labourers	Construction materials being transported to site will contribute to the addition of traffic on the road network	Road network able to support additional trucks.	Low
	Employees and labourers transported to/ from site	Road network able to support additional commuter trips	Low
	Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).	Low
Operational Phase			
Transportation of staff	Haulage to/ from site; and mine staff to/from site	Road network able to support additional trucks.	Low
Dust from vehicle movement	Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).	Low
Noise from vehicle movement	Noise levels affecting sensitive areas including residential areas	Speed limits to be kept low and define routes away from residential areas.	Medium-Low
Decommissioning and Rehabilitation Phase			

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Removal of rubble and other materials from site	Added traffic on the road network	Road network able to support additional trucks.	Medium-Low

10.5 Groundwater Impacts

10.5.1 Aquifers

The types of aquifers on the project area will be determined during geohydrological impact assessment. Hydrocensus will be undertaken by the appointed specialist.

10.5.2 Impact Assessment

Table 18: Groundwater impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Drilling	<p>Groundwater contamination as a result of drilling of new monitoring boreholes to investigate possible preferred groundwater flow pathways and one or two areas outside preferred pathways, which will:</p> <ul style="list-style-type: none"> a) Identify geological and hydrogeological control across the proposed mining right area; b) Provide facilities to undertake aquifer testing and water sample collection; and c) Serve as future monitoring points in an initial groundwater monitoring network. 	Monthly monitoring of the boreholes with regard to water levels and water quality	Low
Storage of fuels and lubricants and	Spills from improper storage of fuels and lubricants and also from leaking vehicles	<ul style="list-style-type: none"> a) Monthly monitoring of the boreholes with regard to water levels and water quality b) Place drip trays under vehicles when parked. 	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
movement of vehicles		<ul style="list-style-type: none"> c) If in-field refuelling is done from a tanker, it should be done in a designated dirty area and a spill kit and clean- up team must be available on site; d) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; e) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards 	
Operational Phase			
Mine water contamination	Deposition waste rock on WRDs can result in the contamination of groundwater as a result of seepage	<ul style="list-style-type: none"> a) Implement compacted clay or synthetic liner underneath the WRDs to minimize seepage following the waste classification result; b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment 	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		c) Monthly and quarterly monitoring of the surface water and groundwater respectively	
Mine dewatering	Opencast mining of will result in groundwater inflows into the pits, which needs to be pumped out for mine safety. The expected inflow into the pit is 730 m ³ /d when mining floor will reach 20 mbgl. It will stabilise to 1150 m ³ /d when mining floor will reach 90 mbgl	a) Store the dewatered water in PCDs and ensure that the dams will have enough storage volume; b) If that is not possible, re-introduce treated water into the streams after ensuring that they meet the required standards as per the WUL or river quality objectives; c) Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users; d) Monitoring of groundwater water levels and groundwater inflow rates; and e) Update numerical model annually	Medium-Low
Mine water run off	Any contamination that will seep from the WRDs is expected to move eastern direction toward the north-north-east down-gradient of the waste dump. The toe of the plume estimated to	a) Implement compacted clay or synthetic liner underneath the WRDs to minimizes seepage following the waste classification result;	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	extend 700 m away from waste dump, 20 years after contamination commences	b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment; c) Monthly and quarterly monitoring of the surface water and groundwater respectively	
Decommissioning and Rehabilitation			
Decanting and groundwater contamination	<p>After mine closure and ceasing of dewatering, pit is likely to decant. Once the mine starts to decant, it is not expected to stop naturally. Pollution from WRDs on groundwater quality will continue in perpetuity, even after mine closure.</p> <p>Seepage and decant is expected to have a serious impact and require management and rehabilitation measures to prevent irreplaceable impacts. If the pH is acidic, dissolved metals and sulphates will remain in solution</p>	a) Identify decant areas and raise topography to increase time to decant; b) Plan open cast mining so that the perimeters follow the surface contours along the lowest side of the pit and not cut directly across streams; c) Monitoring groundwater levels, decant rates and qualities; d) Revegetated WRD as quickly as possible to minimize recharge rates; e) Divert all clean runoff away from the pit through a series of berms; f) Re-evaluate impact of decant after end of life, once monitoring information is available; and	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		g) Treat seepage and decanted water using passive or active means to meet the recommended standards.	

10.6 Soil, Land Use and Land Capability

10.6.1 Soil chemical conditions

The purpose of establishing baseline chemical composition of soil on a site before development commences, is to determine whether there is any deterioration in soil fertility and what the nutrient status of the soil is associated with the natural vegetation. Should the chemical content of the soil be drastically different once rehabilitation commences, the chemical composition might have to be amended by the addition of fertilizers or organic matter. The analyses results will be obtained from the laboratory and will be attached as Appendix of the Soil, Land Use and Land Capability Specialist Report.

10.6.2 pH

The pH of the soil will be measured potentiometrically in a supernatant suspension of a 1:2.5 soil to liquid mixture. For this assessment potassium chloride (KCl) will be used. The pH levels will be described using the scale of general descriptive terminology as was defined by the United States Department of Agriculture Natural Resources Conservation Service (NRCS).

Table 19: Descriptive terminology for pH ranges (NRCS, USDA)

Description/Denomination	pH range
Ultra-acidic	<3,5
Extremely acidic	3,5 – 4,4
Very strongly acidic	4,5 – 5,0
Strongly acidic	5,1 – 5,5
Moderately acidic	5,6 – 6,0
Slightly acidic	6,1 – 6,5
Neutral	6,6 – 7,3
Slightly alkaline	7,4 – 7,8
Moderately alkaline	7,9 – 8,4
Strongly alkaline	8,5 – 9,0
Very strongly alkaline	>9,0

The pH values of the samples range between 4,73 and 6,09 and are therefore very strongly acidic to slightly acidic. pH values below 5 result in high solubility of aluminium that results in aluminium toxicity symptoms such as stunted root growth and minimum lateral root development (Mengel and Kirkby, 2001). As only samples are below pH 5, the pH levels are not considered a hindrance to agricultural production.

10.6.3 Plant-available phosphorus (P)

Plant-available phosphorus will be extracted with a Bray 1 solution for soils with a neutral to low pH value.

10.6.4 Major cationic plant nutrients

The exchangeable complexed fraction of the major cationic plant nutrients (magnesium, calcium, potassium and sodium) will be determined by percolation of the samples with ammonium acetate and measurement of bases in the percolate.

The organic carbon content will be measured with the Walkley-Black methodology.

10.6.5 Land capability

Land capability can be defined as “the extent to which land can meet the needs of one or more uses under defined conditions of management” (Schoeman, 2002). The land capability of an area is the combination of the inherent soil properties and the climatic conditions as well as other landscape properties such as slope and drainage patterns that may inhibit agricultural land use or result in the development of specific land functionality such as wetlands. Land capability affects the socio-economic aspects of human settlements and determine the livelihood possibilities of an area. Baseline land capabilities are also used as a benchmark for rehabilitation of land in the case of project decommissioning.

Following the land capability classification of the South African Chamber of Mines, the largest portion of the area assessed can be classified as having arable land capability.

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10.6.6 Agricultural potential

The largest portion of the area assessed has suitability for rain-fed agriculture. There are soil physical and chemical evidence that crop cultivation was previously practiced in this area. It is not evident why this has ceased and whether it is as a result of climatic constraints or as a result of a change in landownership. Livestock farming is also considered a viable option for the project site. The site may have potential for irrigated agriculture although no irrigation infrastructure will be observed during the site visit.

10.6.7 Sensitivity analysis of the project site

Following the analysis of the baseline properties of the project site, it can be classified as having high, medium and low sensitivity to the proposed project from the perspective of soil, land capability and agricultural potential. The area around the river has high sensitivity to disturbance but the current proposed surface footprint does not fall within this area. The largest parts of the areas to be disturbed has medium sensitivity to the proposed development as the soil has high arable potential although it is not currently cultivated.

10.6.8 Impact Assessment

Table 20: Soil, land use and land capability impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Transport of materials and labour	This will compact the soil of the existing roads and fuel, and oil spills from vehicles may result in soil chemical pollution	a) Minimise the footprint of the Kedjona Mining Project	Medium-Low
Earthworks	Clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling as well as drilling and blasting for the initial removal of overburden at the planned open cast pit as well as the construction of infrastructure like the Primary Crushing Facility, water management systems, contractors camp. These activities are the most disruptive to natural soil horizon distribution and will impact on the current soil hydrological properties and functionality of soil. It will also change the current land use as well as land capability in areas where activities occur, and infrastructure is constructed	The existing pre-construction mine layout and design are aiming to minimise the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible. All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined. This measure will significantly reduce areas to be compacted by heavy construction vehicles and regular activities during the operational phase	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Handling and storage of building material	This will have the potential to result in soil pollution when not managed properly.	b) Management and supervision of construction teams	Low
Vegetation clearance	Soil erosion is also anticipated due to vegetation clearance.	<p>The activities of construction contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site. In addition, compliance to these instructions must be monitored</p> <p>c) Location of stockpiles</p> <p>Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation. Refrain from locating stockpiles as close as possible to the development for cost saving only to have them relocated later during the life of the operation. The ideal is to place all overburden materials removed during construction in their final closure location, or as close as practicable to it</p>	Medium-low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<p>d) Topsoil stripping</p> <p>Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons.</p> <p>Stripping should be conducted a suitable distance ahead of development of, for example, the open pit, at all times to avoid loss and contamination. As a norm, soil stripping should be kept within 3-9 months of development, or between 50-100 metres ahead of the active operations.</p> <p>e) Stockpiling of topsoil</p> <p>To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 meters maximum. For extra stability and erosion protection, the stockpiles may be benched. The clay</p>	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<p>content of the topsoil on the largest area of the Kedjona Mining project area is not sufficient for stockpiles to remain relatively stable without benching. The areas on the Arcadia soil form do have sufficient clay content</p> <p>f) Prevention of stockpile contamination</p> <p>Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately</p> <p>g) Terrain stability to minimise erosion potential</p> <p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p>	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> • Using appropriate methods of excavating that are in accordance with regulatory requirements and industry best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Using drainage control measures and culverts to manage the natural flow of surface runoff <p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> • Using appropriate methods of excavating that are in accordance with regulatory requirements and industry best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and 	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> • Using drainage control measures and culverts to manage the natural flow of surface runoff <p>h) Management of access and services roads</p> <p>Existing established roads should be used wherever possible. Where possible, roads that will carry heavy-duty traffic should be designed in areas previously disturbed rather than clearing new areas, where possible. The moisture content of access road surface layers must be maintained through routine spraying or the use of an appropriate dust suppressant.</p> <p>Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts will be installed to permit free drainage of existing water courses. The side drains on the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used</p> <p>i) Prevention of soil contamination</p> <p>During the construction phase, chemical soil pollution should be minimised as follows:</p>	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids. 	
Operational Phase			
Open pits and mine infrastructure	Open pits and surface infrastructure will both lead to surface impacts on soil resources. Surface infrastructure like buildings, haul roads, waste rock dumps and product	Management of potential soil contamination during the operational phase	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	stockpiles are by far the most disruptive to current land uses, land capability as well as agricultural potential of the soil. Soil underneath buildings and stockpiles are subject to compaction and sterilization of the topsoil	The following management measures will either prevent or significantly reduce the impact of soil chemical pollution on site during the operation phase:	
Spills of fuel and lubricants	Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localized within the site boundary and have medium-high significance on the soil resource.	<ul style="list-style-type: none"> <li>g) Stockpiles are managed so they do not become contaminated and then need additional handling or disposal; <li>h) A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; <li>i) Processing areas should be contained, and systems designed to effectively manage and dispose of contained storm water, effluent and solids; <li>j) Storage tanks of fuels, oils or other chemicals stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. Above-ground (rather than in-ground) piping systems should be provided. 	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		Containment bunds should be sealed to prevent spills contaminating the soil and groundwater; k) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids l) Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors m) Effluent and processing drainage systems avoid leakage to ground.	
Vehicle movement	Soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). This is a permanent impact that will be localized within the site boundary with medium-low consequence and significance in the mitigated scenario.	Same as above	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Vegetation clearance	During the operational phase, topsoil stockpiles as well as roads running down slopes will still be susceptible to erosion. Soil surfaces with infrastructure such as concrete slabs and buildings will not be exposed to erosion any longer. This is a permanent impact that will be localized within the site boundary with medium-high consequence and significance.	Same as above	
Decommissioning and Rehabilitation			
Traffic movement	Transport of materials away from site. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution	<p>a) Management and supervision of decommissioning teams</p> <p>The activities of decommissioning contractors or employees will be restricted to the planned areas.</p>	
Earthworks	Earthworks will include redistribution of inert waste materials to fill the open pits as well as topsoil to add to the soil surface. These activities will not result in further impacts on land use and land capability but may increase soil compaction	<p>Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition, compliance to these instructions must be monitored.</p>	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Handling and storage of materials	Other activities in this phase that will impact on soil are the handling and storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and rehabilitation activities. This will have the potential to result in soil pollution when not managed properly	<p>b) Infrastructure removal</p> <p>All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site</p> <p>c) Site preparation</p>	
Revegetation	With the decommissioning phase, soil surfaces are in the process of being replanted with indigenous vegetation and until vegetation cover has established successfully, all surfaces are still susceptible to potential soil erosion	<p>Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles</p> <p>d) Seeding and re-vegetation</p> <p>Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore</p>	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<p>disturbed areas to beneficial uses as quickly as possible. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated</p> <p>e) Prevention of soil contamination</p> <p>During the decommissioning phase, chemical soil pollution should be minimised as follows:</p> <p>Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;</p> <ul style="list-style-type: none"> ○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; 	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none">○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste;○ Containing potentially contaminating fluids and other wastes; and○ Cleaning up areas of spillage of potentially contaminating liquids and solids.	

10.7 Heritage Impact Assessment

The Phase I Archaeological and Cultural Heritage Impact Assessment for the proposed mining right of Iron Ore (Fe), Titanium (Ti), Vanadium (V), Chrome (Cr), Copper (Cu), Nickel (Ni), Cobalt (Co), Gold (Au) and Platinum Group Metals (PGM) has identified will be conducted to assess the significant impacts to archaeological or grave resources that will need to be mitigated prior construction.

10.7.1 Impact Assessment

Table 21: Heritage impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Site clearance	Site Clearance for construction activities might reveal or expose archaeological artefacts.	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken b) Education and training on heritage resources will be given to mine employees	Low
Operational Phase			
Excavations of box-cut	Opening of the box-cut might expose or reveal archaeological artefacts	c) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken d) Education and training on heritage resources will be given to mine employees	Low
Decommissioning and Rehabilitation			
Ripping and shaping of compacted areas	Ripping and shaping all compacted areas to be free draining, followed by re-vegetation might expose human remains or archaeological artefacts	e) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken f) Education and training on heritage resources will be given to mine employees	Low

10.8 Visual Assessment

10.8.1 Potential Receptors and Visual Corridors

The visual impact of the proposed activities is determined by the number of observers and their perception. Therefore, it is important to identify potential receptors and assess their sensitivity. According to Oberholzer (2005) different receptor types will display varying degrees of sensitivity to visual impact from the proposed opencast area. For example, nature reserves and visitors to them are regarded as receptors with a high sensitivity, while mining areas are regarded as having a low sensitivity.

Naturally the perceptions of viewers will differ notably given their cultural backgrounds, state of mind, regularity of sighting, and if they are residents or visitors to the area. As a result, this complex subject is approached with a certain degree of generalization, and it is beyond the scope of this study to attempt a detailed breakdown of viewers' perceptions.

10.8.2 Viewshed Analysis

A viewshed is the geographical area that is visible from a location. It includes all surrounding points that are in line-of sight with that location and excludes points that are beyond the horizon or obstructed by terrain and other features (e.g., buildings, trees).

10.8.3 Impact Assessment

Table 22: Visual impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Site and road clearing (removal of soils and vegetation)	<ul style="list-style-type: none"> a) Negative impact on sense of place. b) Dust generation c) Visual intrusion due to heavy machinery 	<ul style="list-style-type: none"> a) Remove minimum amount of natural vegetation and topsoil b) Dust suppression techniques 	Low
Construction of mining infrastructure & buildings	<ul style="list-style-type: none"> a) Visual intrusion due to the presence of construction equipment & machinery, as well as infrastructure b) Heavy vehicles using the roads c) Dust generation d) Introduction of artificial lighting 	<ul style="list-style-type: none"> c) Overnight storage of equipment and materials away from receptors; d) Ensure all equipment on site and general surrounds are maintained; and e) Ensure that rubble, litter and disused construction materials are managed and removed regularly 	Low
Pit excavation	<ul style="list-style-type: none"> a) Altering the topography and visual character b) Dust generation c) Visual intrusion of pit & heavy machinery 	<ul style="list-style-type: none"> f) Use natural hues and non-reflective material on structures to facilitate the structures 'blending' in; g) Use vegetative screens of indigenous species to shield these structures from receptors; h) Retain taller species of natural vegetation where possible to use as additional vegetative screens; and 	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		i) Position these structures, where possible, behind stockpiles and away from receptors j) Make use of down lighting and low impact lighting; and k) Avoid tall lights on periphery and make use of motion sensors	
Operational Phase			
Appearance of WRD	a) Visual disturbance	a) Proper design of WRD to ensure slopes do not exceed a	Low
Blasting & load-and-haul operations	b) Dust generation	1:3 ratio (< 33°) depending on compaction tests done on the receiving soils	
Appearance of RoM stockpile	c) Visual disturbance of heavy machinery using haul roads	b) Establishing successive vegetation communities on the WRD to mitigate the visual intrusion, improve soil stability and reduce dust generation	
	d) Lighting	c) Blasting under controlled conditions (avoid windy days) Blasting should not take place before 08H00 and after 16h00 d) Dust suppression techniques e) Keep RoM stockpile within prescribed height of 3 m	
Decommissioning and Rehabilitation			

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Reclaiming stockpiles & WRD, removal of infrastructure	a) Visual intrusion associated with closure activities b) Dust generation	a) Overnight storage of equipment and materials away from receptors; b) Ensure all equipment on site and general surrounds are maintained; c) Limit operations to daylight hours; d) Maintain vegetative screens along roads carrying substantial traffic until Closure Phase is completed; and e) Ensure that litter are managed and removed regularly	

10.9 Terrestrial Biodiversity

10.9.1 Vegetation

The Kedjona Mining project area is located within the Sekhukhune Montane Grassland and Rand Highveld Grassland of the Mesic Highveld Grassland Bioregion.

(a) Sekhukhune Montane Grassland (Gm 19)

This occurs on major chains of hills that transect the area and have a north-south orientation, creating moderately steep slopes with predominantly eastern and western aspects. Large norite boulders and stones cover the shallow soils on the hillsides. Dense, sour grassland occur on slopes of mountains and undulating hills, with scattered clumps of trees and shrubs in sheltered habitats. Dense, tall grassland is found on the plains and encroachment by indigenous or invasion by alien microphyllous tree species is common in places. Important taxa include:

- Small trees: *Protea caffra* subsp. *caffra* (d), *Acacia caffra*, *Apodytes dimidiata* subsp. *dimidiata*, *Canthium suberosum*, *Cussonia transvaalensis*, *Seemannaralia gerrardii*;
- woody climbers: *Rhoicissus tridentata* (d), *Lasminum quinatum*, *Triaspis glaucophylla*. *Austro-africana*;
- tall shrubs: *Euclea crispa* subsp. *crispa* (d), *Brachylaena ilicifolia*, *Diospyros austro-africana*, *Euclea linearis*, *Pavetta zeyheri*;
- low shrubs: *Gnidia caffra* (d), *Senecio microglossus* (d), *Dyschotiste rogersii*, *Elephantorrhiza praetermissa*, *Leonotis leonurus*, *Polygala uncinata*, *Rhus discolor*, *R. tumulicola* var. *meeuseana*, *R. wilmsii*;
- geoxylic suffrutex: *Elephantorrhiza elephantina*;
- graminoids: *Aristida junciformis* subsp. *galpinii* (d), *Oiheteropogon amplexans* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. racemosa* (d), *Heteropogon contortus* (d), *Microchloa caffra* (d), *Monocymbium ceresiiforme* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tristachya leucothrix* (d), *Andropogon schirensis*, *Aristida aequiglumis*, *Brachiaria serrata*, *Cymbopogon caesius*, *Oigitaria diagonalis*, *O. monodactyla*, *Ehrharta capensis*, *Eragrostis capensis*, *E. nindensis*, *E. plana*, *Hyparrhenia hirta*, *Loudetia simplex*, *Panicum natalense*, *Setaria nigrirostris*, *Trachypogon spicatus*, *Triraphis andropogonoides*;

- herbs: *Acalypha punctata* (d), *Berkheya setifera* (d), *Rothea hirsuta* (d), *Senecio latifolius* (d), *Tephrosia purpurea* subsp. *leptostachya* (d), *Berkheya insignis*, *Gerbera jamesonii*, *Helichrysum nudifolium* var. *nudifolium*, *Ipomoea crassipes*, *Jamesbrittenia silenoides*, *Macledium zeyheri* subsp. *argyrophyllum*, *Pegolettia lanceolata*, *Pentanisia prunelloides* subsp. *prunelloides*, *Senecio coronatus*, *Vernonia galpinii*, *V. natalensis*, *V. oligocephala*, *Xerophyta retinervis*;
- geophytic herbs: *Hypoxis rigidula* var. *pilosissima* (d), *Cheilanthes hirta*, *Eucomis montana*, *Hypoxis hemerocallidea*, *Pachycarpus transvaalensis*; and
- succulent herb: *Kleinia stapeliiformis*.
- Biogeographically important taxa: (NNorthern sourveld endemic, SKSekhukhune endemic)
- Small trees: *Euclea sekhukhurnensis*SK, *Lydenburgia cassinoides*SK, *Rhus sekhukhuniensis*S;
- woody climber: *Rhoicissus sekhukhuniensis*SK;
- tall shrub: *Vitex obovata* subsp. *Wilmsii*N;
- low shrubs: *Dyschoriste perrottetii*SK, *Grewia verrucosa*N, *Helichrysum uninervium*N, *Jamesbrittenia rnecrentha*SK, *Melhanian reridii*N;
- succulent shrub: *Aloe castenea*N;
- herbs: *Berkheya densioliola*N, *Cyanotis pechyrrhiza*N, *Graderia linearifolia*N, *Ipomoea bathycolpos* var. *sinuatodentata*SK, *Rhynchosia rudolfii*N, *Tetraselago wilrnsii*N;
- geophytic herbs: *Gladiolus sekukuniensis*SK, *Zantedeschia pentlandii*SK; and
- succulent herb: *Huernia insigniflora*N.

Endemic taxa:

- Succulent shrubs: *Aloe reitzii* var. *reitzii*, *Oelosperma deilanthoides*; and
- geophytic herbs: *Resnova* sp. nov. ('megaphylla'), *Zantedeschia pentlandii*.

(b) Rand Highveld Grassland (Gm 11)

This occurs on a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. There is a high diversity of herbs. Rocky hills and ridges carry sparse (savannoid) woodlands accompanied by a rich suite of shrubs. Poorly conserved, only small patches protected. Almost half has been transformed mostly by cultivation, plantations, urbanisation or dam-building. Important taxa includes:

- Graminoids: *Ctenium concinnum* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *Diheteropogon amplexans* (d), *Eragrostis chloromelas* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Monocymbium ceresiiforme* (d), *Panicum natalense* (d), *Schizachyrium sanguineum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya biseriata* (d), *T. rehmannii* (d), *Andropogon schirensis*, *Aristida aequiglumis*, *A. congesta*, *A. junciformis* subsp. *galpinii*, *Bewsia biflora*, *Brachiaria nigropedata*, *B. serrata*, *Bufbostylis burchellii*, *Cymbopogon caesius*, *Digitaria tricholaenoides*, *Elionurus muticus*, *Eragrostis capensis*, *E. curvula*, *E. gummiflua*, *E. plana*, *E. racemosa*, *Hyparrhenia hirta*, *Melinis nerviglumis*, *M. repens* subsp. *repens*, *Microchloa caffra*, *Setaria nigrirostris*, *Sporobolus pectinatus*, *Trichoneura gran-diglumis*, *Urelytrum agropyroides*;
- herbs: *Acanthospermum australe* (d), *Justicia anagalloides* (d), *Pollichia campestris* (d), *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Helichrysum caespitium*, *H. nudifolium* var. *nudifolium*, *H. rugulosum*, *Ipomoea crassipes*, *Kohautia amatymbica*, *Lactuca inermis*, *Macleodium zeyheri* subsp. *argyrophyllum*, *Nidorella hottentotica*, *Oldenlandia herbacea*, *Rothea hirsuta*, *Selago densiflora*, *Senecio coronatus*, *Sonchus dregeanus*, *Vernonia oligo-cephala*, *Xerophyta retinervis*;
- geophytic herbs: *Boophone disticha*, *Cheilanthes hirta*, *Haemanthus humilis* subsp. *humilis*, *Hypoxis rigidula* var. *pilosissima*, *Ledebouria ovatifolia*, *Oxalis corniculata*;
- succulent herb: *Aloe greatheadii* var. *davyana*;
- low shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Indigofera comasa*, *Rhus magalismsontana*, *Stoebe plumose*;
- succulent shrub: *Lopholaena coriifolia* (d); and
- geoxylic suffrutex: *Elephantorrhiza elephantine*.

Biogeographically Important Taxa (all Northern sourveld endemics):

- Geophytic herbs: *Agapanthus inapertus* subsp. *pendulus*, *Eucomis vandermerwei*;
- succulent herb: *Huernia insigniflora*; and
- low shrub: *Melhaniania randii*.

Endemic taxa:

- Herbs: *Melanospermum rudolfii*, *Polygala spicata*;

- succulent herbs: *Anacampseros subnuda* subsp. *lubberrisii*, *Frithia humilis*;
- succulent shrubs: *Crassula arborescens* subsp. *undulatifolia*, *Delosperma purpureum*; and
- small trees: *Encephalartos lanatus*, *E. middelburgensis*.

10.9.2 Field Investigation

The field investigation will consist of random sampling throughout the mining area with more focused sampling within the opencast pit area and plant area. The vegetation within the project area will be confirmed during site visit. The overall plant diversity within the project area will be assessed and then considered accordingly.

10.9.3 Fauna

10.9.3.1 Mammals

The assessment for mammal species will be conducted at desktop level and field investigation to determine the probability of occurrence of faunal species. It must be noted that the possible species list will be at desktop level and may include species that were previously recorded in the area and are no longer occurring. The field investigation will be conducted by traversing the project area by vehicle and on foot.

10.9.3.2 Avifauna

A desktop avifaunal investigation will be conducted to determine the bird species that may occur within the project area. A total of bird species will be recorded to occur within the project area. The field survey will be conducted by traversing the project area by vehicle and on foot. Visual observations and calls are the main identifiers of bird activity, with focus placed on areas around open water and tree canopies.

10.9.4 Impact Assessment

Table 23: Terrestrial Biodiversity impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Site clearance for establishment or access roads, infrastructure and pit area	Clearing of vegetation	Avoid sensitive areas and implement buffer zones	Low
	Loss of plant SSC	Limit the footprint area to the pit and infrastructure Avoid areas of remaining indigenous vegetation	Low
	Displacement of fauna species	Avoid high biodiversity sensitivity areas (natural vegetation, watercourses & wetlands) and comply to prescribed buffer zones	Low
	Loss of faunal SSC	Avoid areas in which plant species of conservation concern may occur; If some areas cannot be avoided implement rescue of plant species of conservation concern	Low
Operational Phase			
Operation of mine and access roads	Alien plant establishment	Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas	Medium

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	Disturbance/Displacement of Faunal species	Minimise footprint area Work only in clearly demarcated areas	Medium
	Disturbance of vegetation communities	Minimise footprint area Work only in clearly demarcated areas	Medium
	Habitat fragmentation	Minimise footprint area Work only in clearly demarcated areas	Medium
	Killing of faunal species	Minimise footprint area Work only in clearly demarcated areas	Medium
Decommissioning and Rehabilitation Phase			
Shaping of landscape	Loss of species of conservation concern	All infrastructure that could have a negative impact on faunal species (powerlines etc.) needs to be decommissioned and removed	Medium
Revegetation of landscape	Impact on the growth and health of both fauna and flora	Implement rehabilitation strategy and rehabilitation interventions	Medium
Monitoring of plant species establishment	Establishment of vegetation	Implement rehabilitation monitoring plan and remedy actions	Medium
	Habitat reconstruction	Implement rehabilitation monitoring plan and remedy actions	Medium
	Habitat stabilisation	Implement rehabilitation monitoring plan and remedy actions	Low

10.10 Health Impact

10.10.1 Human Health Impacts of Minerals

Mining rarely result in a fully confined exposure to the target material being extracted from the environment. Where Iron Ore rock is not pure, and it rarely is pure, then Iron Ore dust is equally impure and thereby contains the impurities of which many are associated/ contaminated with 'heavy metals'⁷. Magnetite is the most commonly mined ore of iron. It is also the mineral with the highest iron content (72.4%).

Where the concentration of those other 'heavy metals' is not immediately commercially viable to be processed then those other heavy metals are routinely dumped upon an above ground waste rock dump where the concentrations can be accumulated to a commercial viability whilst the dust from those piles can be spread (blown and/or washed) across the environment. It is assumed the parting ore will either be stockpiled as a low-grade ore or be sent to the waste rock dump, depending on its grade.

Some heavy metals (like iron) have been reported to be of bio-importance to man and their daily medicinal and dietary allowances had been recommended. Dietary iron can be found in meat, whole meal products, potatoes and vegetables. The human body absorbs iron in animal products faster than iron in plant products. Iron is an essential part of haemoglobin; the red colouring agent of the blood that transports oxygen through the human body. Iron is an essential nutrient for humans. A common problem for humans is iron deficiency, which leads to anaemia. The average man needs an average daily intake of 7 mg of iron and, 11 mg for the average woman. A normal diet will generally provide all that is needed.

Iron may cause conjunctivitis, choroiditis, and retinitis if it contacts and remains in the tissue. Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable as an x-ray change. No physical impairment of lung function has been associated with siderosis.

Exposure to iron ore dust can cause metal fume fever. This is a flu-like illness with symptoms of metallic taste, fever and chills, chest tightness and cough. Prolonged or repeated contact can discolour the eyes causing permanent iron staining. Repeated exposure might cause changes seen on a chest x-ray. Silica being a common constituent of iron ore dust, prolonged exposure might cause silicosis and other related lung diseases (Keast, 1989).

Although the area has vanadium, the current proposed Kedjona Mining MVT mine will produce a crushed material that will be smelted for titanium. There is no known biological role for titanium. There is a detectable amount of titanium in the human body, and it has been estimated that we take in about 0.8 mg/day, but most passes through us without being adsorbed (Lenntech, 2017). It is not a poison metal and the human body can tolerate titanium in large dose.

Elemental titanium and titanium dioxide are of a low order of toxicity. Laboratory animals (rats) exposed to titanium dioxide via inhalation have developed small-localized areas of dark-coloured dust deposits in the lungs. Excessive exposure in humans may result in slight changes in the lungs –titanium has the ability to affect lung function causing lung diseases such as pleural disease, it can cause chest pain with tightness, breathing difficulties, coughing, irritation of the skin or eyes.

Effects of overexposure to titanium powder: Dust inhalation may cause tightness and pain in chest, coughing, and difficulty in breathing. Contact with skin or eyes may cause irritation. Routes of entry: Inhalation, skin contact, eye contact.

Carcinogenicity: The International Agency for Research on Cancer (IARC) has listed titanium dioxide within Group 3 (The agent is not classifiable as to its carcinogenicity to humans.)

According to the WHO (2001), there is limited toxicokinetic information suggesting that vanadium is absorbed following inhalation (in humans) and is subsequently excreted via the urine with an initial rapid phase of elimination, followed by a slower phase, which presumably reflects the gradual release of vanadium from body tissue. Following oral administration, tetravalent vanadium is poorly absorbed from the gastrointestinal tract. There were no dermal studies available.

In inhalation and oral studies in laboratory animals, absorbed vanadium in either pentavalent or tetravalent states is distributed mainly to the bone, liver, kidney, and spleen, and it is also detected in the testicles (ibid.). The main route of vanadium excretion is via the urine. The pattern of vanadium distribution and excretion indicates that there is potential for accumulation and retention of absorbed vanadium, particularly in the bone. There is evidence that tetravalent vanadium has the ability to cross the placental barrier to the foetus.

The nature of the toxicity of vanadium pentoxide and other vanadium compounds is such that it is not possible to clearly identify the threshold level, for any route of exposure relevant to humans, below which there would be no concern for potential genotoxic activity.

A more recent study conducted by Lenntech Water Treatment Solutions (2014) states that insoluble vanadium compounds are not regarded as serious hazard, however, workers exposed to vanadium peroxide dust were found to suffer severe eye, nose and throat irritation. The uptake of vanadium by humans mainly takes place through foodstuffs, such as buckwheat, soya beans, olive oil, sunflower oil, apples and eggs. This same study asserts that vanadium can have a number of effects on human health, when the uptake is too high. When vanadium uptake takes places through air it can cause bronchitis and pneumonia (Lenntech, 2014).

The acute effects of vanadium are irritation of lungs, throat, eyes and nasal cavities. Other health effects of vanadium uptake are:

- a) Cardiac and vascular disease;
- b) Inflammation of stomach and intestines;
- c) Damage to the nervous system;
- d) Bleeding of livers and kidneys

The health hazards associated with exposure to vanadium are dependent on its oxidation state. Magnetite contains elemental vanadium. Elemental vanadium could be oxidized to vanadium pentoxide during welding. The pentoxide form is more toxic than the elemental form. Chronic exposure to vanadium pentoxide dust and fumes may cause severe irritation of the eyes, skin, upper respiratory tract, persistent inflammations of the trachea and bronchi, pulmonary oedema, and systemic poisoning. Signs and symptoms of overexposure include; conjunctivitis, nasopharyngitis, cough, laboured breathing, rapid heartbeat, lung changes, chronic bronchitis, skin pallor, greenish-black tongue and an allergic skin rash.

10.10.2 Impact Assessment

Table 24: Health Impact Assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction, Operational and Decommission Phase			
Housing design	Communicable Diseases Linked to Housing Design	<p>c) Collaborate with the DoH on awareness-creation around vaccinations to communicable diseases for vulnerable sub-populations such as children and old people;</p> <p>d) Labour policies should encourage hiring of local staff to avoid excessive job-seeking migrants. The Project should not hire at the “front gate” but consider a recruitment office at an off-site location. This will need to consider national recruitment and employment requirements;</p> <p>e) Reduce the prevalence of communicable diseases by collaborating with relevant government departments and schools for awareness creation and improved understanding of factors exacerbating communicable diseases, including coping strategies that result in behaviour change; and initiating competitions at schools for illustrating innovative ways to improve conditions at home - either by reducing exposure and susceptibility or increasing coping capability.</p>	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<p>f) Support community-based information campaigns related to TB symptoms and the need to seek care. The campaign should address the risk of co-infection between HIV and TB;</p> <p>g) Influx management and advice with regards to town planning to prevent overcrowding; and</p> <p>h) Develop partnerships to support the community-based TB control programs in conjunction with the DoH and any NGOs. This needs to include case detection, management and surveillance activities under the national TB program policy and strategy</p>	
Unprotected Sex	Sexually Transmitted Infections, including HIV/AIDS	<p>b) Develop a HIV/AIDS policy that incorporates both the workplace and community considerations;</p> <p>c) Develop an integrated HIV management program that considers both the workplace and the community. TB and STI must be integrated into this;</p> <p>d) Support equal employment opportunities for women and establish livelihood programs to reduce risk for opportunistic sexual encounters and empower women and young girls to earn their own income to be in a position to provide for themselves without having to resort to sexual transactions;</p>	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> e) Support (financial or otherwise) NGO groups active in the area on gender-based sexual violence; and f) Support community-based condom distribution centres. These should be linked to other initiatives and not be run in isolation. 	
Contamination of potable water	Soil-, Water- and Waste-related Diseases	<ul style="list-style-type: none"> a) Conduct baseline water and sanitation studies on communities based on accepted health indicators; b) Monitor for groundwater organics, bi-annually, including: Total Coliform, E. Coli and Heterotrophic plate count; c) Ensure proper disposal of human waste that is generated from the Project; d) Ensure proper waste management from Project generated waste according to waste management principles; e) Support the local authority in supporting and improving water and sanitation services, including the collection and disposal of waste in the communities; f) Establish water and sanitation committees in the communities to manage their own water and sanitation services. This will improve sustainability of any outreach support; g) Support information campaigns in the community on water use, hygiene and general sanitation; and 	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		h) Depending on the results of the baseline data gathering, support the government's school deworming programme in partnership with local authorities.	

**Impacts will remain the same during all phases*

10.11 Surface Water

10.11.1 Water Quality Assessment.

Collected water samples will be sent to a South African National Accreditation System (SANAS) accredited laboratory to be analysed for physical and chemical water quality parameters. The water quality guidelines that are used will be determined from the land use and current water use. The following guidelines and standards will be used for interpretation as and when applicable:

- a) SANS 241 (2015), Drinking Water – Edition 2.
- b) Department of Water Affairs and Forestry, 1996. South African Water Quality Guidelines (second edition), Volume 5: Agricultural Water Use: Livestock watering.

The drinking water guidelines will be used as they are the most comprehensive set of standards and provide for a worst-case scenario where the water is unintentionally used for consumption by humans. Both the DWS and the SABS standards for drinking water will be referred to in the final report. SANS 241 specifies the quality of acceptable drinking water, defined in terms of microbiological, physical, aesthetic and chemical determinants. Water that complies with SANS 241 is deemed to present an acceptable water quality for consumption (this implies an average consumption of 2 litres of water per day for 70 years by a person that weighs 60 kg).

10.11.2 Water Balance

A site wide water balance will be prepared to understand the flows within the mine's operation water circuit for the wet and dry season as well as annual averages throughout the life of mine. The modelled water balance circuit includes water inflows, losses and transfers for the following aspects of the operation:

- a) Open Pit;
- b) Mining area;
- c) Process Plant (crushing and screening plant);
- d) Stockpiles (WRD) and ROM pads, and;
- e) Various Support Services (offices, laboratory, stores and yards, change house, workshops and load out stations)

The water balance will be used by the mine in support of the Water Use Licence (WUL) application as well as a water management tool to achieve goals of water management such as:

- a) Understanding the water circuit at the mine;
- b) Estimating the water volumes required during deficits and excess volumes produced during surplus, and;
- c) Assessing the site for areas where water conservation may be implemented.

The water balance will be developed in static / steady state water balance – the dry season inflows, transfers and losses which are not influenced by rainfall and are modelled as a set of steady flows.

10.11.3 Conceptual Stormwater Management Plan

The main objective of SWMP measures is to ensure that surface water risks within the project sub-catchment are minimised. The primary risk is the contamination of the surface water environment (including storm water drainage) from the mobilisation of ore and sandy material, as well as dirty water into the clean catchment.

The proposed conceptual stormwater management plan will include:

- a) Clean stormwater will be diverted around dirty catchments and allowed to flow towards the watercourses on either side of the site depending on the topography. This will be accomplished through the construction of upstream clean water diversion berms/channels to prevent clean water from entering the dirty areas and ensure that it drains away from the site through the channels upstream of dirty areas;
- b) Moderately clean areas that otherwise cannot easily be conveyed to the clean water system between the planned road and the infrastructure will be collected with the dirty water system for reuse;
- c) A series of dirty water berm and channel systems will be required to capture and convey runoff emanating from the dirty water areas (plant, mining area and RoM). The dirty water trenches will convey the runoff to the PCD via a silt trap;
- d) Open channels are preferred for ease of maintenance and can easily be constructed to accommodate design capacity, whilst maintaining suitable drainage gradients;
- e) Stormwater collecting in the PCD will be pumped to the Process Water Dam (PWD) during and after rainfall events to supply the plant's water requirements; and
- f) Considering the general topography, a PCD location is proposed at the downstream most (southern corner of the mining department)

10.11.4 Impact Assessment

Table 25: Surface water impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction			
Exposure of topsoil	Sedimentation of watercourses due to exposing and loosening of soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses due to hydrocarbon and chemical spillages	<ul style="list-style-type: none"> a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites b) Vegetation should only be removed where absolutely necessary; c) Hydrocarbons should be stored on hardpark bunded facilities to ensure that all spillages are contained; and d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities 	Low
Vegetation removal	Altered drainage paths and loss of catchment yield due to the removal of vegetation and construction of diversion berms.	Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment.	Medium-Low
Operational Phase			

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Mining activities	Pollution of surrounding watercourses as a result of activities during the operational phase (spills, overflows and contaminated runoff)	a) There are no mitigation measures for a loss of contained water to the catchment yield as long as the mine is there however, b) Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment. - Sustainable mine water management needs to be implemented.	Medium - Low
Decommissioning and Rehabilitation Phase			
Mine decommissioning	Pollution of surrounding watercourses as a result of activities during the decommissioning phase	a) The perimeter stormwater management measures should remain in place and should only be removed once rehabilitation of other activities has been completed. This will capture most of the sediment produced from rehabilitation activities and any spills from removal of hydrocarbon and chemical storage; b) Credible contractors should be used for the cessation of the mining and decommissioning of all infrastructure.	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Post-closure activities	Rehabilitation of the site post mining will result in a positive impact on surface water quantity when completed.	Rehabilitation will result in a positive improvement as surface water drainage patterns will be restored to a state similar to pre-mining which is likely to result in an improvement in catchment yield after land profiling and cover having been restored	Medium-Low

10.12 Aquatics Ecology

10.12.1 Field Assessment

A field assessment will be conducted over two surveys. The selected assessment points will be presented in the final EIR report.

10.12.2 Impact Assessment

Table 26: Aquatic impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Site clearance for establishment of access roads, infrastructure and pit area	Sedimentation as a result of bare areas of soil	<ul style="list-style-type: none"> a) Sediment trapping berms Stormwater management plans b) Dry season construction 	Low
Vehicle movement and refuelling	Pollution of water resources as result of hydrocarbon spills	<ul style="list-style-type: none"> a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site 	Low
Operational Phase			
Operation of mine and access roads	Vehicular movement and sedimentation	<ul style="list-style-type: none"> a) Sediment trapping berms b) Stormwater management plans 	Low
	Pollution of water resources as a result of mine waste	<ul style="list-style-type: none"> a) Implement Integrated Waste Water Management Plan b) Aquatic biomonitoring 	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	Pollution of water resources as result of hydrocarbon spills	a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site	Low
Decommissioning and Rehabilitation Phase			
Shaping of landscape	Sedimentation as a result of bare areas of soil	a) Sediment trapping berms b) Stormwater management plans c) Dry season working d) Aquatic biomonitoring	Low
Vehicular and machinery movement	Pollution of water resources as result of hydrocarbon spills	a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site	Low

10.13 Socio-Economic Impacts

The Emakhazeni Local Municipality has been encountering challenges which range from economic, environmental, social and spatial challenges. At a regional scale, like other with various lagging municipalities, Mpumalanga is faced with developmental challenges coupled with socio-economic problems such as unemployment, job creation, education, HIV prevalence, basic service delivery, inequality, poverty, economic growth, sectorial dependency and economic distribution.

For the purpose of this Project, social impacts have been assessed in light of the current existing socio-economic challenges in the local area. It is expected that the proposed Kedjona Mining Project will result in social changes which may positively or negatively affect communities within the study area. In terms of the social changes that have been assessed, the following social impacts have been identified:

- a) Employment opportunities;
- b) Change in movement patterns;
- c) Loss of agricultural land and infrastructure;
- d) Physical and Economic displacement;
- e) Impact on the local tourism industry;
- f) Increased pressure on Municipal infrastructure;
- g) Increased social pathologies linked to the influx of workers and job seekers; and
- h) Increased nuisance factors and changed sense of place;

In light of the abovementioned, the following social variables were considered to determine the likely impacts:

- a) Demographic processes refer to the movement and structure of the local community;
- b) Geographic characteristics- refer to the processes that affect the land uses of the local area;
- c) Economic processes refer to the economic activities with the affected project area;
- d) Socio-cultural wellbeing- refer to the processes that affect the local culture of an affected area, i.e. the way in which the local community live;
- e) Institutional, legal, political and equity-refers to the processes that affect service delivery of the study area.

The findings of this SIA indicate the proposed Kedjona Mining Project has positive and negative potential impacts which range in significance. The construction and the operation of the proposed Kedjona Mining

Mine's positive impacts are mainly due to creation of employment opportunities, boosting of the local economy due to increased disposal disposable income and contribution to the revenue for the Emakhazeni Local Municipality. Negative impacts may be experienced due to loss of agricultural land, physical and economic displacement, increased pressure on municipal infrastructure, increased social pathologies linked to influx of job workers and work seekers, increased nuisance factors and changed sense of place.

10.13.1 Impact Assessment

Table 27: Socio-economic impact assessment

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Impacts			
Construction activities	The residual impacts associated with the creation of employment and business opportunities and training during the construction phase is that the workers can improve their skills by gaining more experience.	<ul style="list-style-type: none"> a) Establish targets for employment and training; b) Train workforce for longer term employment; c) Adopt recruitment strategies that ensure local people are given employment preference; d) Effective implementation of training and skills development initiatives; e) The recruitment process has to be transparent and equitable; f) Maximise and monitor local recruitment; g) Consult local labour recruitment offices; h) Prevent nepotism/corruption in local recruitment structures; i) Promote employment of women and youth; j) Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and 	Positive impact

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		k) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force	
	Multiplier impacts on the local economy	a) Development of a register of local SMMEs; b) Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; c) SMME skills development as part of mine SLP/LED commitments d) Create synergies with other mining/electricity enterprises LED/CSR projects e) Preference should be given to capable subcontractors who based within the local municipal area; f) Align skills development to build capacity of SMMEs; g) Monitoring of sub-contractors procurement; h) Development of a i) register of local SMME; and j) Local procurement targets should be formalised in Kedjona Mining's procurement policy	Positive impact
	a) Improved economic development;	a) Ensure that there is stakeholder buy-in; b) Aligning LED projects with those of other development role-players; c) Liaison with beneficiaries to ensure needs are met;	Positive impact

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	<p>b) Increased capacity to develop and maintain livelihood strategies</p>	<p>d) Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones;</p> <p>e) Expanding its skills development and capacity building programmes for non-employees</p> <p>f) Monitoring system to regulate Historically Disadvantaged South African procurement</p> <p>g) Where feasible, training should be NQF Accredited; and</p> <p>h) A record of training courses completed per individual should be kept</p>	
	<p>Increase in injuries and possible loss of lives</p>	<p>a) Access control to all project elements, including fencing;</p> <p>b) Personal Protective Equipment for mine workers;</p> <p>c) Notification of blasting schedules;</p> <p>d) Blasting and storage of hazardous materials to adhere to prescribed regulation;</p> <p>e) Measures suggested minimising the impact of flyrock on surrounding roads and structure;</p> <p>f) Measures suggested in the Health Impact Assessment to minimize traffic related accidents;</p>	<p>Low</p>

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> g) Traffic calming measures to prevent speeding (e.g. speed humps); h) Road maintenance; i) Provide safe road crossing points and fencing of the main road and the mine site; and j) Community education to sensitize community members to potential traffic and blasting safety risks 	
	Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities; b) Kedjona Mine should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked; c) Measures to prevent deterioration of roads; d) suggested in Traffic Impact Assessment (e.g. drivers to report road deterioration to the NW Province Department of Transport); e) Regulation of traffic at intersections and access roads to the site; f) Road upgrading measures should be investigated and implemented in conjunction with the relevant government department (e.g. repairing and rehabilitating the main roads and sealing the roadway to increase its capacity for Heavy Moving Vehicles); 	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> g) Inform communities of planned construction activities that would affect vehicle/pedestrian traffic; h) Ensure that access to key services are uninterrupted by providing alternative access routes in cases where construction activities restricts or disrupt movement i) Construction of cattle crossings at suitable intervals should be incorporated into project design 	
	<ul style="list-style-type: none"> a) Displaced farm workers; b) Loss of livelihoods 	<ul style="list-style-type: none"> a) Suitable mitigation measures should be defined that protect the farm workers and ensure that they are adequately provided for and supported should they be moved or lose their employment. b) A Resettlement Action Plan and associated Livelihood Restoration Plan may be required. c) Implement surface lease agreements with all community members who have grazing or ploughing land, this will minimise the impact of economic displacement. d) Implement the Grievance Mechanism to ensure ongoing, proactive engagement and effective management of grievances 	Medium-Low
	Strain on the existing infrastructure which is already inadequate	<ul style="list-style-type: none"> a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; 	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<ul style="list-style-type: none"> b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Kedjona Mining Project; and d) Liaison with district and local municipalities well in e) advance to ensure needs are met f) Ensure that municipalities take into account expected population influx g) Promotion of mining methods to allow for surface development h) Influx management i) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders 	
Operational Impacts			
Operational activities	The impact may be reversible over time as workers and jobseekers leave the area, consequences such as HIV/AIDS and unwanted pregnancies will be permanent	<ul style="list-style-type: none"> a) Limit, as far as reasonably possible, social ills caused by influx of workers and jobseekers; b) Liaise openly and frequently with affected stakeholders to ensure they have information about the Project; c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that Kedjona Mining Mine has no control over 	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		<p>activities related to workers' behaviour, however It is recommended that HIV/AIDS campaigns are conducted within the affected area;</p> <p>d) Discourage influx of jobseekers by prioritising employment of unemployed members of local communities;</p> <p>e) Liaise with Moses Kotane Local Municipality, and Traditional Authority to ensure that expected population influx is taken into account in infrastructure development and spatial development planning;</p> <p>f) Create synergies with local government IDP and other companies' SLP/CSR projects to promote infrastructure development;</p> <p>g) Clear identification of workers –prevention of loitering;</p> <p>h) Liaison with police or establish/ support community policing forum;</p> <p>i) Promote projects providing housing, especially low-cost housing, to link with the proposed Kedjona Mining mine;</p> <p>j) Community education; and</p> <p>k) Implement measures to address potential conflict between locals and non-locals</p>	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	The increase in nuisance factors and associated changed sense of place will be negative, and direct as a result of Project activities, and indirect as a result of migrant jobseekers	<ul style="list-style-type: none"> a) Minimise all nuisance factors such as noise, air quality, traffic, and visual-Implement all mitigation measures as specified in the relevant specialist studies; b) Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors 	Low
	Strain on the existing infrastructure which is already inadequate.	<ul style="list-style-type: none"> a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Kedjona Mining Project; and d) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders 	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	Loss of grazing land	<ul style="list-style-type: none"> a) Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner with the intention to acquire only the required servitude area; b) Should Kedjona Mining Mine acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes – potentially as part of a lease agreement; c) Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be implemented as part of the decommissioning phase 	Medium-Low
	Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities; b) Kedjona Mining should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked 	Low
Operational activities	a) Developed local economy;	Maximise benefits from local employment, skills and economic development	

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	b) Increased capacity to develop and maintain livelihood strategies		
	Increase in injuries and possible loss of lives	<ul style="list-style-type: none"> a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of fly-rock on surrounding roads and structure; f) Measures suggested in the Health Impact Assessment to minimize traffic related accidents; g) Traffic calming measures to prevent speeding (e.g. speed humps); h) Road maintenance; i) Provide safe road crossing points and fencing of the main road and the mine site; and j) Community education to sensitize community members to potential traffic and blasting safety risks 	Low
Decommissioning and Rehabilitation Phase			

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Mine closure	The impact may be reversible over time as workers and jobseekers leave the area, consequences such crime and other social pathologies will be permanent	<ul style="list-style-type: none"> a) Effect retrenchments according to procedures stipulated in approved SLP; b) The Mine's SLP should provide strategies and measures that prevent job loss; c) Support economic diversification through development of alternative markets; d) Develop a Mine Closure Plan; e) Proactively and effectively implement mine closure plan; f) Collaborate with adjacent mining companies to develop and implement sustainable community; g) Develop alternative and sustainable livelihoods; h) Alternatives to save jobs/avoid downscaling should be investigated beforehand; i) Proactively assess and manage the social and economic impacts on individuals, regions and economies where retrenchment and/or closure of the mine are certain; and j) Partner with the relevant government departments, to jointly manage Closure process 	Medium

10.14 Waste Management Impacts

The construction, operational and closure/rehabilitation activities will give rise to waste materials which, if not properly managed, could cause pollution of air, soil, surface water and groundwater. Wastes other than mining residues are typically generated in small enough quantities to be stored in skips until they can be removed for recycling or disposal, and there will be no need to construct lined waste management facilities for such wastes.

10.14.1 Waste Assessment Methodology

Collected samples will be analysed in order to classify the WRD material in accordance with the NEM: WA Regulations (2013) and NEM: WA, 2014 (Act No, 26 of 2014, by comparison with total and leachable concentration thresholds.

Total Concentration values will be determined by *aqua regia* digestion and analysis with ICP methods.

Total Concentration Threshold limits are subdivided into three categories as follows:

- a) TCT0 limits based on screening values for the protection of water resources, as contained in the Framework for the Management of Contaminated Land (DEA, March 2010);
- b) TCT1 limits derived from land remediation values for commercial/industrial land (DEA, March 2010); and
- c) TCT2 limits derived by multiplying the TCT1 values by a factor of 4, as used by the Environmental Protection Agency, Australian State of Victoria.

Leachable concentration will be determined by following the Australian Standard Leaching Procedure for Wastes, Sediments and Contaminated Soils (AS 4439.3-1997), as specified in the NEM: WA Regulations (2013). The procedure recommends the use of reagent water for leaching of non-putrescible material that will be mono-filled.

Leachable Concentration Threshold (LCT) limits will be subdivided into four categories as follows:

- a) LCT0 limits derived from human health effect values for drinking water, as published by the Department of Water and Sanitation (DWS) and South African National Standards (SANS);
- b) LCT1 limits derived by multiplying LCT0 values by a Dilution Attenuation Factor (DAF) of 50, as proposed by the Australian State of Victoria;
- c) LCT2 limits derived by multiplying LCT1 values by a factor of 2; and
- d) LCT3 limits derived by multiplying the LCT2 values by a factor of 4.

Waste is classified by comparison of the total and leachable concentration of elements and chemical substances in the waste material to TCT and LCT limits as specified in the National Norms and Standards for Waste Classification and the National Norms and Standards for Disposal to Landfill as per Table 28.

Table 28: Waste Classification Criteria

Waste Type	Element or chemical substance concentration	Disposal
0	$LC > LCT3$ OR $TC > TCT2$	Not allowed
1	$LCT2 < LC \leq LCT3$ OR $TCT1 < TC \leq TCT2$	Class A or Hh:HH landfill
2	$LCT1 < LC \leq LCT2$ AND $TC \leq TCT1$	Class B or GLB+ landfill
3	$LCT0 < LC \leq LCT1$ AND $TC \leq TCT1$	Class C or GLB- landfill
4	<p>$LC \leq LCT0$ AND $TC \leq TCT0$ for metal ions and inorganic anions</p> <p>AND all chemical substances are below the total concentration</p> <p>limits provided for organics and pesticides listed</p>	Class D or GLB- landfill

10.14.2 Impact Assessment

Table 29: Waste management impacts

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Construction Phase			
Construction activities	Typical wastes produced during construction activities include unused concrete mix, oils, lubricants, paints, solvents, packaging materials, general domestic waste and offcuts of building materials such as steel, wood, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution	a) Sort the wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers; b) Have recyclable wastes removed by responsible recyclers; and c) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfill	Low
Operational Phase			
Mining activities	Contamination of groundwater from WRD seepage	Kimopax advises that monitoring boreholes be established near the waste rock dumps	Low
	In terms of the National Environmental Management Amendment Act 2014, mining residues are classified as	a) Manage waste in accordance with Regulations GN R.634.	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	wastes and must be managed as prescribed by the National Environmental Management: Waste Act of 2008 and its Regulations GN R.632 and R.633	b) Undertake regular inspection and maintenance of waste management facilities; c) Monitor groundwater and surface water quality down-gradient of waste management facilities; and d) Take such corrective action as may be required.	
Decommissioning and Rehabilitation			
Mine closure	Wastes expected to result from the decommissioning and rehabilitation activities include scrap metals, building rubble, oils, lubricants, paints, solvents, contaminated soils, waste rock dumps and potentially recyclable materials such as steel, wood, plastics, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution, an impact rated as	a) Identify areas of possible soil contamination, sample such areas, analyse and determine degree of soil contamination. Remove and dispose of soil with contamination levels exceeding then prevailing standards/guidelines; b) Sort the remaining wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non- recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers; c) Have recyclable wastes removed by responsible recyclers; and	Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		d) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfills	

10.15 Blasting and Vibration

10.15.1 Blasting Design

Prior to the start of blasting a proposed blast design should be modelled to determine the firing sequence and the number of holes firing together and the combined charge mass per delay. Based on these figures the peak particle velocities should be calculated at the points of concern. These predictions should be compared to recognised standards to ensure compliance. When acceptable results are obtained, the design should be fixed for use.

The final blast design should be marked and drilled off. After the blast is drilled off and charging commences then the process should be audited to ensure that all stages of the operation are proceeding as per the design. The blast pattern, blasthole depths, charge mass per hole and final stemming lengths should all be checked. Any unusual occurrences should be noted and where possible, immediately corrected.

10.15.2 Ground Vibration

Ground vibration may attract comment from people in the vicinity of a blast. Ground vibration disturbances will need to be quantified to ensure compliance with recognised and accepted industry standards such as the United States Bureau of Mines Standard (USBM RI 8507) or the Deutsches Institut für Normung (DIN) Standard. Ground vibrations occur as a consequence of blasting activity. The intensity of the vibrations depends on a number of factors some of which can be managed and controlled to help reduce the impact.

The two principal factors that control vibration levels are distance and charge weight. Vibration energy is attenuated by the rock mass so normally lower amplitudes are experienced further from a blast. Vibration levels will increase as the charge weight increases. The larger the charge mass the higher the amplitude of the vibration. The charge weight can be controlled by reducing the blasthole diameter or limiting the number of holes that fire at an instant in time.

10.15.3 Fly Rock

Side effects such as fly rock is undesirable and usually occur unexpectedly, sometimes for unknown reasons. Fly rock typically originates either from the breaking face or the surface of the blast.

10.15.4 Impact Assessment

Table 30: Blasting and vibration impacts

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
Operational Phase			
Opening up of the pit	<p>Airblast</p> <p>Airblast is usually the main cause of blasting related complaints. Airblast is an atmospheric pressure wave consisting of high-frequency sound that is audible and low-frequency sound or concussion that is sub-audible and cannot be heard. Either or both of the sound waves can cause damage if the sound pressure is high enough (Konya).</p> <p>Airblast results from explosive gasses being vented to the atmosphere that results in an air pressure pulse. This occurs as a consequence of stemming ejections or hole blowouts, direct rock displacement through face ruptures or surface cratering, the use of high Velocity of Detonation (VOD) accessories that are left unconfined and / or uncovered (e.g.</p>	<ul style="list-style-type: none"> a) Exercise ongoing care and control during all stages of the drilling and blasting operation. Check, check and check again. b) Prior to charging up the blast, the holes drilled should be inspected and all 'problem' holes identified for corrective action. Examples of 'problem' holes could include holes that are under burdened, holes that are short drilled, holes surrounded by badly cracked ground and off pattern holes that could potentially lead to problems. c) Production QC checks must be implemented as part of the Standard Operating Procedures. This is particularly important if bulk explosives are being 	Medium-Low

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
	detonating cord on surface), by ground vibration or by various combinations of the above.	<p>used. During charging up of the holes the bulk explosive product should be sampled on an ongoing basis to ensure acceptable quality. The explosive's supplier should have standard operating procedures in place to address this issue. These procedures should be shared with the end user.</p> <p>d) After charging up is complete and prior to stemming the holes closed, the holes should be taped to determine the explosive column rise to ensure that the required stemming length is obtained. Any errors must be corrected before the hole is stemmed closed.</p> <p>e) The tie up should be carried out according to the blast plan to ensure that the timing and sequencing of the blast proceeds as planned.</p> <p>f) Avoid prolonged sleeping of blasts particularly in wet ground conditions. It is preferable to charge and blast in the shortest possible time frame.</p>	
<p>Fly Rock</p> <p>Fly rock typically originates either from the breaking face or the surface of the blast. The main causes are under burdened holes, geological discontinuities,</p>	Medium-Low		
<p>Blast Fumes and Dust</p> <p>Explosives are formulated to be oxygen balanced to minimize fumes and optimize the energy output. Fumes such as carbon monoxide and oxides of nitrogen can be produced in the detonation process. Dust on the other hand is an inevitable consequence of blasting.</p>	Medium-Low		

Activity	Impact Description	Mitigation Measures	Significance Rating After Mitigation
		g) If fumes occur after a blast, then the area must be kept clear until these have dissipated. h) The stipulated re-entry times must be enforced.	

11 SUMMARY OF ENVIRONMENTAL IMPACTS

11.1 Summary Construction Impacts

Summary of construction impacts indicated in **Table 31**

Table 31: Summary of construction impacts

Potential Environmental Impact	Environmental Significance Before Mitigation						Environmental Significance After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
	Construction Phase											
Air Quality	1	3	3	3	21	Medium-High	1	2	1	1	4	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Site clearance, civil works and vehicle movement will cause dispersion of PM10 and PM2.5 particulates and emissions from vehicles												
Noise Impact will be limited by distance, existing noise levels and relatively short construction period	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Traffic Impact Increased traffic flow along gravel roads giving rise to dust production	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Groundwater Contamination from accidental spills and improper storage of fuels and lubricants	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Soil, land use and land capability Soil compaction resulting from vehicle movement and soil contamination resulting from accidental spills	1	1	2	3	12	Low-Medium	1	1	1	2	6	Low-Medium
Heritage Impacts will occur only if fossils are unearthed during earthmoving operations	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Visual Altering the topography and visual character, dust generation, visual intrusion of pit & heavy machinery	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Terrestrial Biodiversity Removal of flora and stripping of topsoil and also	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
the disturbance of faunal habitat												
Health Impact communicable diseases linked to housing design and HIV and STIs	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Surface water Sedimentation of watercourses and altered drainage paths and loss of catchment yield.	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium
Aquatic Ecology Sedimentation as a result bare area of soil and pollution of water courses resulting from hydrocarbon spills	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Socio-economic Employment creation	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Waste management Poor waste management could cause soil contamination by hydrocarbons, chemicals, cement	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Blasting and Vibration Fumes produced in the detonation process	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium

11.2 Summary of Operational Impacts

Potential impacts resulting for the operational phase are indicated in **Table 32**

Table 32: Summary of operational impacts

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Operational Phase												
Air Quality Particulate mobilisation from stockpiles, crushers, and vehicular movement	1	3	1	3	12	Low-Medium	1	3	1	2	6	Low-Medium
Noise Noise unlikely to cause exceedances of guideline levels, but some receptors will experience intrusive noise	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium
Traffic Impact	1	3	1	3	15	Low-Medium	1	3	1	1	5	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Increase in traffic on the road networks												
Groundwater Groundwater inflow into the pit and reduction of groundwater levels due to dewatering of pits	1	3	2	3	18	Medium-High	1	3	1	1	5	Low
Soil, land use and land capability Loss of current land uses and agricultural productivity and soil compaction from vehicle movements	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Heritage Excavations may expose archaeological artefacts	1	3	2	3	18	Medium-High	1	3	1	1	5	Low
Visual Appearing of WRD and blasting which cause the	1	3	1	3	15	Low-Medium	1	3	1	1	5	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
altering the topography and visual character, dust generation, visual intrusion of pit & heavy machinery												
Terrestrial Biodiversity Displacement of faunal, habitat fragmentation	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Health Impact communicable diseases linked to housing design and HIV and STIs	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Surface water Pollution of surrounding watercourses due to spills, overflows and contaminated run-off	3	3	3	2	18	Medium-High	1	3	1	1	5	Low
Aquatic Ecology	1	3	2	3	18	Medium-High	1	3	1	1	5	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Sedimentation as a result bare area of soil and pollution of water courses resulting from hydrocarbon spills												
Socio-economic Strain on basic services and loss of livelihoods for relocated farmers. Possible increase in HIV/AIDS and unwanted pregnancies.	3	3	3	3	27	High	1	3	1	2	10	Low-Medium
Waste management Mining residues have low potential for mobilisation of contaminants	2	3	3	3	24	Medium-High	1	3	1	1	5	Low
Blasting and Vibration	1	3	2	3	18	Medium-High	1	3	1	2	12	Medium

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Fumes and fly rock produced in the detonation process												

11.2.1 Summary of Decommissioning and Rehabilitation Phase

Impacts emanating from decommissioning and rehabilitation phase are indicated in **Table 33**.

Table 33: Summary of decommissioning and rehabilitation impacts

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Decommissioning and Rehabilitation Phase												
Air Quality Considerations and impacts similar to construction phase, possibly greater due to larger area and eddy	2	3	1	3	18	Medium-High	1	3	1	1	5	Low

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Noise Noise unlikely to cause exceedances of guideline levels, but some receptors will experience intrusive noise	3	3	3	3	27	High	3	3	1	1	7	Low-Medium
Traffic Impact Significantly less traffic than operational phase, but will have some effect on road safety, wear & tear, driver frustration.	2	3	3	3	24	Medium-High	1	3	1	1	5	Low
Groundwater Decanting and groundwater contamination	2	3	3	3	24	Medium-High	1	3	1	1	5	Low
Soil, land use and land capability Soil impacts on WRD footprints will be	3	3	3	3	27	High	3	3	1	1	7	Low-Medium

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
permanent. Elsewhere, mixing of topsoil with subsoil during rehabilitation would have an adverse impact												
Heritage The closure and rehabilitation activities cannot possibly affect any items of archaeological or cultural significance unless earthmoving takes place on areas of the site where no such activities were undertaken during the construction and operational phases. If any	0	0	0	0	0	None	0	0	0	0	0	None

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
Visual Reclaiming stockpiles & WRD, removal of infrastructure	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Terrestrial Biodiversity Habitat stabilisation and reconstruction	1	3	3	3	21	Medium-High	1	3	1	1	5	Low
Health Impact communicable diseases linked to housing design and HIV and STIs	1	1	1	2	6	Low-Medium	1	1	1	1	3	Low
Surface water Increase in surface water quantity	2	3	2	3	21	Medium-High	1	3	1	1	5	Low
Aquatic Ecology Sedimentation as a result bare area of soil and	3	3	3	3	27	High	3	3	1	1	7	Low-Medium

Potential Environmental Impact	Environmental Significance						Environmental Significance					
	Before Mitigation						After Mitigation					
	E	D	I	P	TOTAL	RISK	E	D	I	P	TOTAL	RISK
pollution of water courses resulting from hydrocarbon spills												
Socio-economic Loss of jobs and local spend can be softened by skills training and support for entrepreneurs and proper rehabilitation of disturbed footprint.	2	3	3	3	24	Medium-High	1	3	1	1	5	Low
Waste management Mobilisation of particulates and other contaminants from mining residue deposits	2	3	3	3	24	Medium-High	1	3	1	1	5	Low

12 CUMMULATIVE IMPACTS

12.1 Terrestrial Biodiversity

Cumulative impacts are contextual and encompass a broad spectrum of impacts at different spatial and temporal scales (IFC, 2013) i.e. cumulative impacts can result from individually minor but collectively significant activities taking place over a period of time (Dutta, et al., 2012). The following cumulative impacts are anticipated:

- a) Permanent loss of and altered floral and faunal species diversity;
- b) Alien floral invasion; and
- c) Disturbed areas are highly unlikely to be rehabilitated to pre-development conditions of ecological functioning and a loss of floral and faunal habitat, species diversity and SCC will most likely be permanent.

12.1.1 Mitigation Measures

Some of the impacts can be avoided and this may be achieved by:

- a) The placement of the pit area and infrastructure areas beyond sensitive habitats;
- b) Avoidance of protected plant and animal species
- c) The relocation of identified faunal species to similar and adequate habitat areas

Impacts that cannot be avoided can be minimized; such mitigation measures include the following, for example:

- a) Control of alien invasive plant species; and
- b) Maintaining as small a footprint as possible.

Areas that are cleared for construction, but not required for operation of the development can be rehabilitated. This should be done using plant SSC rescued and propagated, as well as other species that are propagated for rehabilitation purposes.

12.2 Hydrology

Even with extensive mitigation, significant latent impacts on the receiving aquatic ecological environment are deemed likely. The following points highlight the key latent impacts that are anticipated:

- a) Disturbance of ecologically sensitive aquatic habitats and downstream areas;
- b) Sedimentation of aquatic habitat;
- c) Deterioration of water quality of the aquatic resources;
- d) Alteration of aquatic habitat.

12.2.1 Mitigation Measures

The mitigation actions provided below are important to consider with other specialist assessment which include but are not limited to the following specialist studies: Groundwater, Surface Water and Wetlands. Proposed mitigation measures are as follows:

- a) Placing sediment trapping berms;
- b) Implementing a stormwater management plan with purpose to re-use the water for dust suppression.
- c) Affected watercourse areas must be rehabilitated to maintain functionality.
- d) The banks of rivers and streams are often susceptible to collapse and must be monitored and reinforced if needed.

13 ENVIRONMENTAL IMPACT STATEMENT

13.1 Summary of the Key Findings of the Environmental Impact Assessment.

The impact assessment above discusses impacts and provides an overall impact assessment. Although some impacts of high significance may be anticipated, no fatal flaws have been identified for the project thus far.

The surface infrastructure area will be placed and avoids all highly sensitive habitat such as wetlands, rivers and ridges. The flora associated with this area is transformed due to agriculture and thus the

loss of biodiversity is not significant in this area. Impact to the agriculturally important soils is a significant impact, thus correct soil stripping, handling and management is important.

The infrastructure area will be designed to minimise the overall footprint as far as possible. Clean and dirty water areas will be mapped, and a storm water management plan will be compiled in accordance with GN704. Ensuring properly designed storage areas (waste, chemicals and mine residue) and practising good housekeeping practices at all times by ensuring all materials are properly stored within designated areas, will further reduce the potential risk for contamination by surface water runoff. Although not further detailed here, other impacts of moderate or lower significance must be managed in accordance with the EMP.

13.2 Final Site Map

(Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.)

13.3 Summary Of the Positive And Negative Implications And Risks Of The Proposed Activity And Identified Alternatives.

Refer to Table 9: Positive and Negative impact of the proposed activity

14 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR;

The EMP will address the environmental impacts during the Construction, Operational, Decommissioning and Post-Closure Phases of the Project. Due regard must be given to environmental protection during the entire Project; many environmental recommendations are made to achieve environmental protection. The impact management objectives and outcomes of the proposed project are as follows:

- a) Reduce mine decant at the rehabilitated pits
- b) To reuse contaminated water from mining site and prevent discharge of contaminated onto natural environment
- c) To continually monitor ground water levels and water quality to ensure that adverse impacts are managed.
- d) Re-shape rehabilitated slopes to ensure free draining
- e) Monitor dust dispersion as per the Dust Regulations
- f) Monitor noise during all phases of the mine
- g) Reduction of traffic congestion on feeder roads
- h) To establish a buffer zone between ecologically sensitive areas and the mine boundaries
- i) To prevent soil compaction, contamination and soil erosion
- j) To prevent sedimentation and surface water contamination
- k) To continually carry out noise surveys to assess the impacts of noise on the surrounding communities
- l) Create road safety culture amongst the employees during all phase of the mine

15 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The authorisation should include the following conditions:

- a) Compliance with the approved EMPr
- b) Undertaking of environmental performance assessment reporting once in every two (2) years.
- c) Revising quantum financial provision on an annual basis
- d) External auditing of the EMPr by an independent environmental auditor

16 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.

All specialist studies will be conducted to certain levels of confidence, and in all instances known and accepted methodologies will be used, and confidence levels are generally high. This means that in most cases, the situation described in the pre-mining environment may be accurate at high certainty levels, but there exists a low probability that some issues may not be identified during the studies. Such situations cannot be avoided simply due to the nature of field work.

17 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

The EIA/EMPr is a comprehensive document with information provided through the specialist studies, none of which identified fatal flaws. Upon review of all specialist input, the project should go ahead with the recommended mitigation measures contained in the final EIA/EMPr. It is, therefore, Kimopax's reasoned opinion that the activity be authorised on condition that the EMP is fully adhered to, annually audited and amended where necessary based on audit findings.

17.1 Rehabilitation requirements

Rehabilitation of the project will aim to:

- a) Ensure that the final elevation around the site is free draining.
- b) Ensure that soil replaced in the same sequence to ensure soil characteristics are retained as far as possible.
- c) Ensure a self-sustaining post-mining land capability similar to pre-mining of grazing and limited low-intensity arable lands.
- d) Ensure that the rehabilitated areas are cleared of all contaminating substances and that runoff from the area is returned to the natural catchment.
- e) Ensure that vegetation growth and cover on the rehabilitated area is sustainable and local indigenous species are establishing on site and that succession and colonisation from surrounding areas is taking place on rehabilitated areas.
- f) Ensure that alien invasive growth is eradicated until the closure certificate is granted.

18 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.

The Environmental Authorisation will be required for a period of 30 years.

19 UNDERTAKING

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the EIA Report and the EMPr.

20 FINANCIAL PROVISION

As per NEMA financial provision regulations, itemised costs must be provided within the financial provision. As the DMR's closure cost assessment provides itemised costs, this process was used to determine the quantum for financial provision. Financial Provision will be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

21 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY.

21.1 Deviations From the Methodology Used in Determining The Significance Of Potential Environmental Impacts And Risks.

No deviations will be made

21.2 Motivation For the Deviation.

Not applicable as no deviation was made

22 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

22.1 Socio-Economic Impacts

The directly affected people will be farm owners and the neighbours.

Impacts and mitigation measures are detailed in the Social Impact Assessment Specialist report.

22.2 Impact On Any National Estate Referred to In Section 3(2) Of The National Heritage Resources Act.

Despite that no archaeological objects were observed during the site visit, and that the area is disturbed due to farming activities, the client is reminded that unavailability of archaeological material does not mean absentee, archaeological material might be hidden underground. It is thus the responsibility of the developer to notify contractors and workers about archaeological material (e.g., pottery, stone tools, remnants of stone-walling, graves, etc.) and fossils that may be located underground. Furthermore, the client is reminded to take precautions during construction.

22.3 Other Matters Required in Terms Of Sections 24(4)(a) and (b) of the Act.

Section 24(4) (b) (i) of the Act specifies the need for investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.

PART B

**ENVIRONMENTAL MANAGEMENT
PROGRAMME REPORT**

23 ENVIRONMENTAL MANAGEMENT PROGRAMME.

23.1 Introduction

An Environmental Management Plan (EMP) is a document used to prescribe management mechanisms/methods for the prevention of undue or reasonably avoidable adverse environmental impacts and for the enhancement of the positive environmental benefits of a development. An EMP can be based on the National Environmental Management Act (Act No. 107 of 1998, (NEMA)(as amended), and also bestows a 'Duty of Care' on those who cause, have caused or may in future cause pollution or degradation of the environment, as per of Section 28(1) of NEMA

23.2 Objectives of the EMP

The EMP has been compiled to provide recommendations and guidelines for environmental monitoring throughout the construction and operational phase of the proposed mining project. This is done to ensure that all relevant factors are considered, and to ensure for environmentally responsible development. More specific objectives for this EMP include:

- a) Provide an outline of the legal requirements;
- b) Ensuring compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- c) The mitigation management of construction associated impacts such as water quality impairment, flow modification, loss of riparian habitat and loss of aquatic ecosystem services;
- d) To assign roles and responsibilities to parties involved regarding the implementation of this EMPr;
- e) To describe a monitoring / stakeholder engagement programme which will enable a review of the success of the EMPr;

- f) To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the proposed project;
- g) Identifying construction activities that might have detrimental impacts on the environment;
- h) To identify measures that could optimize beneficial impacts;
- i) To establish a method of monitoring and auditing environmental management practices during all phases of project
- j) Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- k) Propose mechanisms for monitoring compliance with the EMPr and reporting thereon;

23.3 Details of the EAP

The details of the EAP have been provided in Section 6, Item 6.1 in Part A of this report.

23.4 Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (7.1.1) herein as required).

Refer to Section **Error! Reference source not found.** of Part A.

23.5 Composite Map

(Provide a map (Attached as an Appendix) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers).

23.6 Description Of Impact Management Objectives Including Management Statements

The objectives of impact mitigation and management are to:

- a) Primarily pre-empt impacts and prevent the realisation of these impacts - PREVENTION.
- b) To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
- c) To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
- d) Implement an adequate monitoring programme to:
 - Ensure that mitigation and management measure are effective.
 - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
 - Reduce duration of any potential negative impacts.

Environmental management outcomes and related management statements are:

- a) Protect the biophysical environment as far as possible.
 - Minimise impacts to the biophysical environment.
 - Ensure relevant legislation are applied on site including but not limited to alien invasive management and protection of ecologically sensitive species and environments.
 - Permits for any activities related to protected species on site will be sought prior to these species being affected. Preservation and 'offset' approaches will be applied to these species as far as possible.
- b) Protect the water resources in the area.
 - Ensure clean and dirty water separation systems are established on site from the onset and are in line with GN704 principals.
 - Use water responsibly and recycle water as much as possible.
 - Ensure relevant legislation regarding the National Water Act are applied on site.

-
- Ensure IWUL is obtained prior to activities commencing on site.
 - Annually update the IWWMP with updated data recorded from site.

 - c) Ensure atmospheric pollution is to a minimum:
 - Manage dust generation.
 - Revegetate all bare soil.

 - d) Mine responsibly and ensure operation is compliant with legislative requirements.
 - Ensure an adequate rehabilitation model is compiled before decommissioning.
 - Ensure soil utilisation guide is applied on site and maintain soil berms and stockpiles at all times from the onset of activities.
 - Conduct annual EMP audits and complete the necessary amendment process where this is deemed necessary.

 - e) Ensure socially responsible mining:
 - Ensure the targets and objectives set out in the SLP are followed and adhered to.
 - Provide a safe environment for people to work in:
 - ✓ Ensure safety policies are established on site in line with national policy.
 - ✓ Ensure adequate PPE for staff, contractors and visitors to the site.
 - ✓ Ensure health and environmental policies are established and in line with national policies.

 - f) Protect historical and cultural aspects:
 - Ensure all archaeological and cultural artefacts/sites are preserved in situ until such time that authorisation to remove these is obtained.
 - Ensure South African Heritage Resources Act principals are applied with regard to all the archaeological and cultural artefacts/sites
 - Ensure any relocation of culturally sensitive sites is done according to SAHRA principals, in a socially sensitive manner and with open and transparent communication with relevant I&APs.

 - g) Maintain open and transparent dialogue with I&APs:
-

- Conduct regular feedback meetings with I&APs (at least biannually).
- Maintain a complaint register on site and respond to comments in a timely manner.
- Ensure communications and any necessary agreements are made between any sensitive I&APs identified through any stage of the project.

23.7 Determination of Closure Objectives.

The overall closure objective is to restore the area disturbed by the project activities to condition that is safe for humans and animals and suitable for farming and cattle grazing, and to ensure that off-site environmental quality is not adversely affected by physical effects and chemical contamination arising from the past mining and ore processing activities. This will be done by:

- a) Leaving the haul roads to provide safe and easy access to water accumulating in the pits and to discourage more dangerous access across the waste rock berms (enviro bunds) surrounding the rest of the pit perimeters;
- b) Conducting dedicated soil surveys over the operational footprint area and removing identified pockets of contaminated soil;
- c) Cleaning up of sources of possible soil contamination still present on the site to protect the downstream receiving environment;
- d) Ripping compacted areas and shaping all project-affected areas to be free draining and so that runoff from the rehabilitated project area is routed to the natural drainage lines;
- e) Spreading stockpiled subsoil and topsoil consecutively on areas from which it had been stripped, on the upper surface and sparingly onto the waste rock dumps;
- f) Testing the topsoil and ameliorating/fertilising it appropriately;
- g) Vegetating the site with locally indigenous species of grass, forbs, shrubs and trees
- h) Monitoring groundwater quality and surface runoff for at least 5 years after closure, longer if warranted by the results. Target water quality objectives must be based on pre-closure groundwater and surface runoff quality from the Smarty mine and infrastructure site; and
- i) Providing the required measures to limit at source the generation of contaminants which could adversely affect local groundwater quality.

23.8 Closure Objectives

Closure objectives must be met with regards to:

- a) Topography
 - To ensure that the final elevation will result in the continuation of the pre-mining surface drainage pattern.
- b) Soil, Land Capability and Land Use
 - To ensure that soil types are replaced in correct sequence, subsoil followed by topsoil, and at appropriate depths.
 - To ensure post-mining land capability is at least similar to pre-mining, which is grazing and some arable lands.
 - To ensure that the land capability is self-sustaining.
 - To ensure that pre-mining land uses can continue.
- c) Surface Water
 - To ensure that no dirty water from the site enters the surrounding surface water systems.
 - To maintain flow in downstream rivers to prevent deterioration of ecological status.
- d) Groundwater
 - To ensure that possible plumes originating from the mining areas do not impact significantly on the surface water features or surrounding user's boreholes.
 - To ensure that groundwater users that are impacted have alternative sustainable water sources of the similar quality and quantity.
- e) Flora and Fauna
 - To ensure that vegetation growth and cover on the rehabilitated areas is sustainable.
 - To ensure that alien invasive growth is eradicated until the closure certificate is granted.

- To encourage surrounding animals to return into the rehabilitated areas to maintain the surrounding biodiversity.
- f) Aquatic Ecosystems
 - To ensure that aquatic ecosystems are maintained as close as possible to that of the pre-mining environment.
- g) Wetlands
 - To minimise the disturbance on wetlands.
 - To ensure that the adjacent wetland conditions are similar to that of the pre-mining Present Ecological State.

23.9 The Process for Managing Any Environmental Damage, Pollution, Pumping And Treatment Of Extraneous Water Or Ecological Degradation As A Result Of Undertaking A Listed Activity.

Surface Water

- a) Clean and dirty water separation and dirty water containment features must be established on site, in line with GN704 requirements and engineered designs, prior to any other activity taking place on site:
 - The dirty water catchment must be demarcated and managed as small as possible.
 - Upslope soil berms will be constructed as close to the activity area as possible to divert clean water runoff around the site into natural drainage lines.
 - Where diverted storm water flow enters a wetland or drainage line, flow dissipaters and / or silt traps must be installed if high flow, erosion and / or sedimentation is observed.
 - Internal trenches will be excavated to drain dirty water from the active footprint to lined containment dams. Excavated soils will be placed upslope of the trenches to prevent contamination of the soil with dirty water runoff.
 - All storm water diversion features will be designed to divert a 1:50 year 24hr storm event.
 - All dirty water runoff will be collected in these trenches which will divert the runoff to the PCD.

- Silt traps will be established upslope of PCD to reduce the need for silt clearing in dirty water dams.
 - PCD and high-load trenches will be lined with an appropriate liner.
 - All trenches and PCDs will be designed to contain a 1:50 year 24hr storm event.
- b) Pipelines and pumps required on site will be adequately sized and backups will be available on site to ensure continuation of water transfer activities in event of breakdowns.
- Pipelines should be laid within the dirty water footprint area.
 - Pipelines should have a series of shut-off valves which can prevent flow of contaminated water should leaks occur.
 - Inspect, maintain and repair all pipelines and pumps throughout the life of mine.

23.10 Potential Risk of Acid Mine Drainage.

The acid generation potential of the hard rock and stockpile materials will be estimated by using ABA on the samples that will be collected from waste representing the WRD. The NAG test provides a direct assessment of the potential for a material to produce acid after a period of exposure (to a strong oxidant) and weathering. The test can be used to refine the results of the ABA predictions. In the Net-acid Generating (NAG) test hydrogen peroxide (H₂O₂) is used to oxidize sulphide minerals in order to predict the acid generation potential of the sample.

For the material to be classified in terms of their acid-mine drainage (AMD) potential, the ABA results could be screened in terms of its NNP, %S and NP:AP ratio.

23.11 Volumes And Rate of Water Use Required for The Mining

A total of approximately 125 000 cubic metres will be required.

23.12 Has A Water Use Licence Has Been Applied For?

A water use license application (IWULA) and associated Integrated Water and Waste Management Plan (IWWMP) will be applied will be submitted to the DWS.

23.13 Impacts to be mitigated in their respective phases

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Construction Phase					
Air Quality	Excavations All infrastructure areas, development footprints and associated activities	Dust emissions due to erosion of open storage stockpiles and exposed areas when the threshold wind speed is exceeded.	<ul style="list-style-type: none"> a) Wet suppression, applied sparingly, to ensure the absence of visible dust; b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-A-Side may also be used; c) Enforce low vehicle speeds on unpaved areas (<40 km/h); d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; e) Vegetate the berm and other surfaces that were laid bare as a result of construction with a locally indigenous grass species where practicable, as soon as possible; and f) Requiring contractors to maintain construction vehicles in good condition 	Dust fallout will be monitored and managed as per GNR827 and compared to baseline limits (which already exceed NEMAQA limits). Conditions stipulated in licenses/rights/permits.	Dust management plan must be in place at the start of the project and carried out through all phases of the LOM.
	Vehicle movement	Emissions from the resuspension of loose material on the road surface. Vehicle-entrained dust emissions from the unpaved haul roads within the proposed Kedjona Mining Project mining area potentially represent the most significant source of fugitive dust for the mine	Haul road mitigation measures include tarring or paving, wet suppression and chemical surface treatments. Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions. Other surface treatments include the use of chemicals such as calcium chloride or magnesium chloride. These chemicals attract moisture – drawing moisture out of the air during periods of high humidity, and also reducing the evaporation rate of water during hot periods. Some products contain surfactants which act as wetting agents. These not only reduce the amount of water required for wetting the roads, but also have slight binding properties. Another approach to dust		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			control involves the application of organic or synthetic compounds that physically bind the dust particles together. The disadvantage of paving/tarring, infrequent watering and chemical mitigation measures is their inability to prevent material spillage from being re-entrained		
Ecology	Site clearance for establishment of access roads, infrastructure and pit area	Clearing of vegetation	Avoid sensitive areas and implement buffer zones	Preservation of biodiversity in terms of NEM:BA	From day 1, through life of project until rehabilitation vegetation established
		Loss of plant SSC	Limit the footprint area to the pit and infrastructure Avoid areas of remaining indigenous vegetation		
		Displacement of fauna species	Avoid high biodiversity sensitivity areas (natural vegetation, water courses & wetlands) and comply to prescribed buffer zones		
		Loss of faunal SSC	Avoid areas in which plant species of conservation concern may occur; If some areas cannot be avoided implement rescue of plant species of conservation concern		
Noise Impact	Site clearing	Clearing and stripping of topsoil and vegetation	Earthwork activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem	Environmental Conservation Act, Noise Regulations	From day 1, through life of project until rehabilitation vegetation established
		Construction of mine infrastructure	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem		
Aquatic Ecology	Site clearance for establishment of access roads, infrastructure and pit area	Sedimentation as a result of bare areas of soil	<ul style="list-style-type: none"> a) Sediment trapping berms b) Stormwater management plans c) Dry season construction 	GNR704 and Water Use License	From construction phase until rehabilitation
	Establishment of access roads and crossings structures	Disturbance of watercourse channels and sedimentation	<ul style="list-style-type: none"> a) Upgrade existing roads and causeways b) Dry season construction 		
	Vehicle movement and refuelling	Pollution of water resources as result of hydrocarbon spills	<ul style="list-style-type: none"> a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			c) Spill kits must always be available and ready on-site		
Soil, Land Use and Land Capability	Transport of materials and labour	Transport of materials and labour with trucks and buses as well as other light vehicles using the existing access roads. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution	a) Minimise the footprint of the Kedjona Mining Project The existing pre-construction mine layout and design is aiming to minimise the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible. All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined. This measure will significantly reduce areas to be compacted by heavy construction vehicles and regular activities during the operational phase	NEMA, MPRDA & CARA regarding rehabilitation & erosion control. NEM:BA in terms of protection of biodiversity. Any conditions stipulated in licenses/rights/permits	Demarcate infrastructure area and fence off before any activity takes place and maintain these for life of mine. Rehabilitate areas completely as soon as activity in those areas ceases.
	Earthworks	Earthworks will include clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling as well as drilling and blasting for the initial removal of overburden at the planned open cast pit as well as the construction of infrastructure like the Primary Crushing Facility, water management systems, contractors camp and sewage treatment plants. These activities are the most disruptive to natural soil horizon distribution and will impact on the current soil hydrological properties and functionality of soil. It will also change the current land use as well as land capability in areas where activities occur and infrastructure is constructed	b) Management and supervision of construction teams The activities of construction contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site. In addition, compliance to these instructions must be monitored		
	Handling and storage of building material	This will have the potential to result in soil pollution when not managed properly.	c) Location of stockpiles Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation. Refrain from locating stockpiles as close as possible to the development for cost saving only to have them relocated later during the life of the operation. The ideal is to place all overburden		
	Vegetation clearance	Soil erosion is also anticipated due to vegetation clearance. The impacts of soil erosion are both direct and indirect. The direct impacts are the reduction in soil quality which results from the loss of the			

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		<p>nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. The off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation. Soil erosion is a permanent impact for once the resource has been lost from the landscape it cannot be recovered. Although there are off-site indirect impacts associated with this, the impact is mainly considered to be local.</p>	<p>materials removed during construction in their final closure location, or as close as practicable to it</p> <p>d) Topsoil stripping</p> <p>Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons.</p> <p>Stripping should be conducted a suitable distance ahead of development of, for example the open pit, at all times to avoid loss and contamination. As a norm, soil stripping should be kept within 3-9 months of development, or between 50-100 metres ahead of the active operations.</p> <p>e) Stockpiling of topsoil</p> <p>To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 meters maximum. For extra stability and erosion protection, the stockpiles may be benched. The clay content of the topsoil on the largest area of the Kedjona Mining project area is not sufficient for stockpiles to remain relatively stable without benching. The areas on the Arcadia soil form do have sufficient clay content</p> <p>f) Prevention of stockpile contamination</p> <p>Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with</p>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately</p> <p>g) Terrain stability to minimise erosion potential</p> <p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Using drainage control measures and culverts to manage the natural flow of surface runoff <p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Using drainage control measures and culverts to manage the natural flow of surface runoff 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>h) Management of access and services roads Existing established roads should be used wherever possible. Where possible, roads that will carry heavy-duty traffic should be designed in areas previously disturbed rather than clearing new areas, where possible. The moisture content of access road surface layers must be maintained through routine spraying or the use of an appropriate dust suppressant.</p> <p>Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts will be installed to permit free drainage of existing water courses. The side drains on the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geomembrane lining can be used</p> <p>i) Prevention of soil contamination During the construction phase, chemical soil pollution should be minimised as follows:</p> <ul style="list-style-type: none"> • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids. 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Groundwater	Drilling	Groundwater contamination as a result of drilling of new monitoring boreholes to investigate possible preferred groundwater flow pathways and one or two areas outside preferred pathways, which will: <ul style="list-style-type: none"> a) Identify geological and hydrogeological control across the proposed mining right area; b) Provide facilities to undertake aquifer testing and water sample collection; and c) Serve as future monitoring points in an initial groundwater monitoring network. 	Monthly monitoring of the boreholes with regard to water levels and water quality	Dangerous goods stored and managed as per SANS 10228:2006 and MSDs and MPRDA Regulations. MSHA will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.
	Storage of fuels and lubricants and movement of vehicles	Spills from improper storage of fuels and lubricants and also from leaking vehicles	<ul style="list-style-type: none"> a) Monthly monitoring of the boreholes with regard to water levels and water quality b) Place drip trays under vehicles when parked. c) If in-field refuelling is done from a tanker, it should be done in a designated dirty area and a spill kit and clean-up team must be available on site; d) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; 	Same as above	Same as above

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			e) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards		
Surface Water	Exposure of topsoil	Sedimentation of watercourses due to exposing and loosening of soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses due to hydrocarbon and chemical spillages	<p>a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites</p> <p>b) Vegetation should only be removed where absolutely necessary;</p> <p>c) Hydrocarbons should be stored on hard park bunded facilities to ensure that all spillages are contained; and</p> <p>d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities</p>	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.
	Vegetation removal	Altered drainage paths and loss of catchment yield due to the removal of vegetation and construction of diversion berms	Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment.		
Traffic	Transportation of materials and labourers	Construction materials being transported to site will contribute to the addition of traffic on the road network	Road network able to support additional trucks.	Mine safety in terms of MHSA and relevant regulations	From day 1 until mine closure
		Employees and labourers transported to/from site	Road network able to support additional commuter trips		
		Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).		
Heritage	Site clearance	Site Clearance for construction activities might reveal or expose archaeological artefacts.	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken	Heritage resources act	From construction until closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			a) Education and training on heritage resources will be given to mine employees		
Socio-Economic	Construction activities	The residual impacts associated with the creation of employment and business opportunities and training during the construction phase is that the workers can improve their skills by gaining more experience.	<ul style="list-style-type: none"> a) Establish targets for the employment and training; b) Train workforce for longer term employment; c) Adopt recruitment strategies that ensure local people are given employment preference; d) Effective implementation of training and skills development initiatives; e) The recruitment process has to be transparent and equitable; f) Maximise and monitor local recruitment; g) Consult local labour recruitment offices; h) Prevent nepotism/corruption in local recruitment structures; i) Promote employment of women and youth; j) Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and k) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force 	SLP, Mine Charter and Good relations with communities	From construction until mine closure
		Multiplier impacts on the local economy	<ul style="list-style-type: none"> a) Development of a register of local SMMEs; b) Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; c) SMME skills development as part of mine SLP/LED commitments d) Create synergies with other mining/electricity enterprises LED/CSR projects e) Preference should be given to capable subcontractors who based within the local municipal area; f) Align skills development to build capacity of SMMEs; 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> g) Monitoring of sub-contractors' procurement; h) Development of a register of local SMME; and i) Local procurement targets should be formalised in Kedjona Mining's procurement policy 		
		<ul style="list-style-type: none"> a) Improved economic development; b) Increased capacity to develop and maintain livelihood strategies 	<ul style="list-style-type: none"> a) Ensure that there is stakeholder buy-in; b) Aligning LED projects with those of other development role-players; c) Liaison with beneficiaries to ensure needs are met; d) Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones; e) Expanding its skills development and capacity building programmes for non-employees f) Monitoring system to regulate Historically Disadvantaged South African procurement g) Where feasible, training should be NQF Accredited; and h) A record of training courses completed per individual should be kept 		
		Increase in injuries and possible loss of lives	<ul style="list-style-type: none"> a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Measures suggested in the Health Impact Assessment to minimize traffic related accidents; g) Traffic calming measures to prevent speeding (e.g. speed humps); h) Road maintenance; 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> i) Provide safe road crossing points and fencing of the main road and the mine site; and j) Community education to sensitize community members to potential traffic and blasting safety risks 		
		Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities; b) Kedjona Mining Mine should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked; c) Measures to prevent deterioration of roads; d) suggested in Traffic Impact Assessment (e.g. drivers to report road deterioration to the NW Province Department of Transport); e) Regulation of traffic at intersections and access roads to the site; f) Road upgrading measures should be investigated and implemented in conjunction with the relevant government department (e.g. repairing and rehabilitating the main roads and sealing the roadway to increase its capacity for Heavy Moving Vehicles); g) Inform communities of planned construction activities that would affect vehicle/pedestrian traffic; h) Ensure that access to key services are uninterrupted by providing alternative access routes in cases where construction activities restricts or disrupt movement i) Construction of cattle crossings at suitable intervals should be incorporated into project design 		
		<ul style="list-style-type: none"> a) Displaced farmworkers; b) Loss of livelihoods 	<ul style="list-style-type: none"> a) Suitable mitigation measures should be defined that protect the farmworkers and ensure that they are adequately provided for and supported should they be moved or lose their employment. b) A Resettlement Action Plan and associated Livelihood Restoration Plan may be required. c) Implement surface lease agreements with all community members who have 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>grazing or ploughing land, this will minimise the impact of economic displacement.</p> <p>d) Implement the Grievance Mechanism to ensure ongoing, proactive engagement and effective management of grievances</p>		
		Strain on the existing infrastructure which is already inadequate	<p>a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services;</p> <p>b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services;</p> <p>c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Kedjona Mining Project; and</p> <p>d) Liaison with district and local municipalities well in advance to ensure needs are met</p> <p>f) Ensure that municipalities take into account expected population influx</p> <p>g) Promotion of mining methods to allow for surface development</p> <p>h) Influx management</p> <p>i) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders</p>		
Waste Management	Construction activities	Typical wastes produced during construction activities include unused concrete mix, oils, lubricants, paints, solvents, packaging materials, general domestic waste and offcuts of building materials such as steel, wood, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution	<p>a) Sort the wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers;</p> <p>b) Have recyclable wastes removed by responsible recyclers; and</p> <p>c) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfill</p>	Waste management standards and Regulations	From construction until closure

Operational Phase

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Air Quality	Drilling and blasting	Emissions from drilling are a relatively minor component of the overall emission from an open pit mine. The only available emission factor for drilling is a simple uncontrolled TSP emission factor of 0.59kg/hole for overburden (US EPA, 1995). Clearly, other variables such as the depth of the holes, diameter of the holes, and moisture content of the material being drilled would also be relevant and it might be supposed that an emission factor equation should take account of these variables. However, in the absence of other data (and given the relatively minor contribution of this source to overall emissions from mining operations), it is reasonable to accept the 0.59kg/hole factor for TSP	<ul style="list-style-type: none"> a) Efficiency will be applied to reduce wastage and unnecessary fuel consumption; b) Carbon offsets will be considered if required; c) Concurrent best practice rehabilitation and vegetation monitoring will be applied to allow for the restoration of some the carbon sink functionality within the mining right area. d) Avoid blasting under windy conditions as far as practicable 	Dust fallout will be monitored and managed as per GNR827 and compared to baseline limits (which already exceed NEM:AQA limits). Conditions stipulated in licenses/rights/permits.	Dust management plan must be in place at the start of the project and carried out through all phases of the LOM.
	Processing plant	The moisture content of the material processed can have a substantial effect on emissions	Surface wetness causes fine particles to agglomerate on, or to adhere to, the faces of larger chunks of ore, with a resulting dust suppression effect. However, as new fine particles are created by crushing and attrition, and as the moisture content is reduced by evaporation, this suppressive effect diminishes and may disappear		
	Vehicle movement	Vehicle entrainment from unpaved roads	<ul style="list-style-type: none"> a) Enforcement of a 40 km/hour speed restriction on unpaved haul roads; b) Wet suppression on haul roads, with the addition of a chemical binder if necessary 		
	Crushing and screening	Crushing and screening operations represent significant dust-generating sources if uncontrolled. The large percentage of fines in this dustfall material enhances the potential for it to become airborne. It was assumed that	Wet suppression will be used for both the secondary and tertiary crushing stages		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		primary crushing (crushing to achieve particles of <300mm) will take place in the pit to reduce the ore to a transportable size for the conveyor system.			
	Materials handling	Materials handling operations which are predicted to result in significant fugitive dust emissions from mining operations include the transfer of material by means of loading and offloading of trucks, loading and offloading conveyors, transfer from one conveyor to another and bulldozing. The quantity of dust which will be generated will depend on various non-climatic parameters such as the nature (moisture content and silt content) and volume of the material handled.	<ul style="list-style-type: none"> a) Reduced tipping and drop heights where practicable; b) Regular clean-up at loading areas and on paved surfaces to prevent entrainment by wind or vehicles; c) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Covering of exposed areas with coarsely crushed rock or aggregate material where practicable; e) Maintaining all vehicles in good condition at all times; and f) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS 		
Ecology		<p>Alien plant establishment</p> <p>Disturbance/Displacement of Faunal species</p> <p>Disturbance of vegetation communities</p> <p>Habitat fragmentation</p> <p>Killing of faunal species</p>	<p>Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p>	Preservation of biodiversity in terms of NEMBA	From day 1, through life of project until rehabilitation vegetation established
Noise	<p>Operation of processing plant</p> <p>Pit activities</p>			Environmental Conservation Act, Noise Regulations	

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Hauling of waste rock to the waste dump Hauling of material to the plant Additional traffic Operation of an emergency generator	Noise increase at the boundary of the mine footprint and at the abutting residential	a) All noise sources exceeding 85.0 dBA to be identified and if practical to be acoustically screened off. b) Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the boundaries of the plant have not changed. Speed limit of mining areas to be adhered to at all times Noise readings to be done in the vicinity of and along the emergency boundaries to ensure that the prevailing ambient noise level is not exceeded.		From day 1, through life of project until rehabilitation vegetation established
Aquatic Ecology	Operation of mine and management of access roads	Vehicular movement and sedimentation Pollution of water resources as a result of mine waste Pollution of water resources as result of hydrocarbon spills	a) Sediment trapping berms b) Stormwater management plans a) Implement Integrated Wastewater Management Plan b) Aquatic biomonitoring d) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area e) Vehicle maintenance and inspection daily f) Spill kits must always be available and ready on-site	GNR/04 and Water Use License	From construction phase until rehabilitation
Soil, land use and land capability	Open pits and mine infrastructure	Open pits and surface infrastructure will both lead to surface impacts on soil resources. Surface infrastructure like buildings, haul roads, waste rock dumps and product stockpiles are by far the most disruptive to current land uses, land capability as well as agricultural potential of the soil. Soil underneath	Management of potential soil contamination during the operational phase The following management measures will either prevent or significantly reduce the impact of soil chemical pollution on site during the operation phase:	NEMA, MPRDA & CARA regarding rehabilitation & erosion control. NEM:BA in terms of protection of biodiversity. Any conditions stipulated in licenses/rights/permits	Demarcate infrastructure area and fence off before any activity takes place and maintain these for life of mine. Rehabilitate areas completely as soon as activity in those areas ceases.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		buildings and stockpiles are subject to compaction and sterilization of the topsoil			
	Spills of fuel and lubricants	Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localized within the site boundary and have medium-high significance on the soil resource. Vanadium and titanium are unlikely to cause toxic effects for soil microbes or plants due to dust from or soil stockpiles	<ul style="list-style-type: none"> a) Stockpiles are managed so they do not become contaminated and then need additional handling or disposal; b) A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; c) Processing areas should be contained and systems designed to effectively manage and dispose of contained stormwater, effluent and solids; d) Storage tanks of fuels, oils or other chemicals stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. Above-ground (rather than in-ground) piping systems should be provided. Containment bunds should be sealed to prevent spills contaminating the soil and groundwater; 		
	Vehicle movement	Soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). This is a permanent impact that will be localized within the site boundary with medium-low consequence and significance in the mitigated scenario.	<ul style="list-style-type: none"> e) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids f) Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors 		
	Vegetation clearance	During the operational phase, topsoil stockpiles as well as roads running down slopes will still be susceptible to erosion. Soil surfaces with infrastructure such as concrete slabs and buildings will not be exposed to erosion any longer. This is a permanent impact that will be localized within the site boundary with medium-high consequence and significance. With proper mitigation measures and the	<ul style="list-style-type: none"> g) Solids and slurries are disposed of in a manner consistent with the nature of the material and avoids contamination; and h) Effluent and processing drainage systems avoid leakage to ground. 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		embedded controls as recommended in the Soil Management Plan, it is anticipated that the significance of this impact will be reduced to low			
Groundwater	Mine dewatering	Opencast mining of will result in groundwater inflows into the pits, which needs to be pumped out for mine safety. The expected inflow into the pit is 730 m ³ /d when mining floor will reach 20 mbgl. It will stabilise to 1150m ³ /d when mining floor will reach 90 mbgl	<ul style="list-style-type: none"> a) Store the dewatered water in PODs and ensure that the dams will have enough storage volume; b) If that is not possible, re-introduce treated water into the streams after ensuring that they meet the required standards as per the WUL or river quality objectives; c) Supply equal volumes and better-quality water to affected user if proven that there is an impact on specific users; d) Monitoring of groundwater water levels and groundwater inflow rates; and e) Update numerical model annually 	Dangerous goods stored and managed as per SANS 10228:2006 and MSDs and MPRDA Regulations. MHSa will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.
	Mine water runoff	Any contamination that will seep from the WRDs is expected to move eastern direction toward the north-north-east down-gradient of the waste dump. The toe of the plume estimated to extend 700 m away from waste dump, 20 years after contamination commences	<ul style="list-style-type: none"> a) Implement compacted clay or synthetic liner underneath the WRDs to minimize seepage following the waste classification result; b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment; c) Monthly and quarterly monitoring of the surface water and groundwater respectively 		
Surface water	Mining activities	Pollution of surrounding watercourses as a result of activities during the operational phase (spills, overflows and contaminated runoff)	<ul style="list-style-type: none"> a) There are no mitigation measures for a loss of contained water to the catchment yield as long as the mine is there however; b) Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment. 	Dangerous goods stored and managed as per SANS 10228:2006 and MSDs and MPRDA Regulations. MHSa will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			Sustainable mine water management needs to be implemented	be maintained within SANS 241:2011 standards for hydrocarbons.	hydrocarbons are brought to site for the life of mine.
Traffic	Transportation of staff	Haulage to/ from site; and mine staff to/from site	Road network able to support additional trucks.	Mine safety in terms of MHSAA and relevant regulations	From day 1 until mine closure
	Dust from vehicle movement	Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).		
	Noise from vehicle movement	Noise levels affecting sensitive areas including residential areas	Speed limits to be kept low and define routes away from residential areas.		
Heritage Impact Assessment	Opening of box-cut	Opening of the box-cut might expose or reveal archaeological artefacts	<ul style="list-style-type: none"> a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken b) Education and training on heritage resources will be given to mine employees 	Heritage resources act	From construction until closure
Socio-Economic		The impact may be reversible over time as workers and job-seekers leave the area, consequences such as HIV/AIDS and unwanted pregnancies will be permanent	<ul style="list-style-type: none"> a) Limit, as far as reasonably possible, social ills caused by influx of workers and job-seekers; b) Liaise openly and frequently with affected stakeholders to ensure they have information about the Project; c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that Kedjona Mining Mine has no control over activities related to workers' behaviour; however It is recommended that HIV/AIDS campaigns are conducted within the affected area; d) Discourage influx of job-seekers by prioritising employment of unemployed members of local communities; e) Liaise with Moses Kotane Local Municipality, and Traditional Authority to ensure that expected population influx is taken into account in infrastructure development and spatial development planning f) Create synergies with local government IDP and other companies' SLP/CSR projects to promote infrastructure development; 	SLP, Mine Charter and Good relations with communities	From construction until mine closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> g) Clear identification of workers – prevention of loitering; h) Liaison with police or establish/ support community policing forum; i) Promote projects providing housing, especially low cost housing, to link with the proposed Kedjona Mining MVT mine; j) Community education; and k) Implement measures to address potential conflict between locals and non-locals 		
		The increase in nuisance factors and associated changed sense of place will be negative, and direct as a result of Project activities, and indirect as a result of migrant job-seekers	<ul style="list-style-type: none"> a) Minimise all nuisance factors such as noise, air quality, traffic, and visual- Implement all mitigation measures as specified in the relevant specialist studies; b) Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors 		
		Strain on the existing infrastructure which is already inadequate.	<ul style="list-style-type: none"> a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Kedjona Mining Project; and d) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders 		
		Loss of grazing land	<ul style="list-style-type: none"> a) Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner with the intention to acquire only the required servitude area; 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> b) Should Kedjona Mining MVT Mine acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes – potentially as part of a lease agreement; c) Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be implemented as part of the decommissioning phase 		
		Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities; b) Kedjona Mining should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked 		
		<ul style="list-style-type: none"> a) Developed local economy; b) Increased capacity to develop and maintain livelihood strategies 	Maximise benefits from local employment, skills and economic development		
		Increase in injuries and possible loss of lives	<ul style="list-style-type: none"> a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Measures suggested in the Health Impact Assessment to minimize traffic related accidents; g) Traffic calming measures to prevent speeding (e.g. speed humps); h) Road maintenance; i) Provide safe road crossing points and fencing of the main road and the mine site; and 		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			j) Community education to sensitize community members to potential traffic and blasting safety risks		
Waste management	Mining operations	In terms of the National Environmental Management Amendment Act 2014, mining residues are classified as wastes and must be managed as prescribed by the National Environmental Management: Waste Act of 2008 and its Regulations GNR632 and R633	<ul style="list-style-type: none"> a) Manage waste in accordance with Regulations GNR634–636, b) Undertake regular inspection and maintenance of waste management facilities; c) Monitor groundwater and surface water quality down-gradient of waste management facilities; and d) Take such corrective action as may be required. 	Waste management standards and Regulations	From construction until closure
Decommissioning Phase					
Air quality	Demolition of infrastructure	Particulate mobilisation can be caused by the demolition of buildings and handling of the rubble, backfilling of the storm water dam and “dirty” water collection channels and ripping and shaping of compacted areas	<ul style="list-style-type: none"> a) Wet suppression during landscaping and materials handling activities; b) Enforcement of low vehicle speeds on unpaved areas (<40 km/h); c) Use of shade-cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Vegetation of bare surfaces with a locally indigenous grass species as soon as possible; e) Continue dust fall monitoring until vegetation cover is well established; and f) Requiring contractors to maintain construction vehicles in good condition 	Dust fallout will be monitored and managed as per GNR827 and compared to baseline limits (which already exceed NEMAQA limits). Conditions stipulated in licenses/rights/permits.	Dust management plan must be in place at the start of the project and carried out through all phases of the LOM.
Ecology	Shaping of landscape	Loss of species of conservation concern	All infrastructure that could have a negative impact on faunal species (powerlines etc) needs to be decommissioned and removed	Preservation of biodiversity in terms of NEMBA	From day 1, through life of project until rehabilitation vegetation established
	Revegetation of landscape	Impact on the growth and health of both fauna and flora	Implement rehabilitation strategy and rehabilitation interventions		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Monitoring of plant species establishment	Establishment of vegetation Habitat reconstruction Habitat stabilisation	Implement rehabilitation monitoring plan and remediations Implement rehabilitation monitoring plan and remediations Implement rehabilitation monitoring plan and remediations		
Noise	Rehabilitate of disturbed areas Planting of grass and vegetation at rehabilitated area Maintenance of disturbed area	Noise increase at the boundary of the mine footprint and at the abutting residential	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem Maintenance activities to be done during daytime working hours.	Environmental Conservation Act, Noise Regulations	From day 1, through life of project until rehabilitation vegetation established
Aquatic Ecology	Shaping of landscapes Vehicular and machinery movement	Sedimentation as a result of bare areas of soil Pollution of water resources as result of hydrocarbon spills	e) Sediment trapping berms f) Stormwater management plans g) Dry season working h) Aquatic biomonitoring a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site	GNR704 and Water Use License	From construction phase until rehabilitation
Soil, land use and land capability	Traffic movement Earthworks	Transport of materials away from site. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution Earthworks will include redistribution of inert waste materials to fill the open pits as well as topsoil to add to the soil surface. These activities will not result in further impacts on land use and land	a) Management and supervision of decommissioning teams The activities of decommissioning contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition,	NEMA, MPRDA & CARA regarding rehabilitation & erosion control. NEM:BA in terms of protection of biodiversity. Any conditions stipulated in licenses/rights/permits	Demarcate infrastructure area and fence off before any activity takes place and maintain these for life of mine. Rehabilitate areas completely as soon as activity in those areas ceases.

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		capability but may increase soil compaction	compliance to these instructions must be monitored.		
	Handling and storage of materials	Other activities in this phase that will impact on soil are the handling and storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and rehabilitation activities. This will have the potential to result in soil pollution when not managed properly	<p>b) Infrastructure removal</p> <p>All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site</p> <p>c) Site preparation</p>		
	Revegetation	With the decommissioning phase, soil surfaces are in the process of being replanted with indigenous vegetation and until vegetation cover has established successfully, all surfaces are still susceptible to potential soil erosion	<p>Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles</p> <p>d) Seeding and re-vegetation</p> <p>Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated</p> <p>e) Prevention of soil contamination</p>		

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>During the decommissioning phase, chemical soil pollution should be minimised as follows:</p> <p>Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;</p> <ul style="list-style-type: none"> ○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; ○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; ○ Containing potentially contaminating fluids and other wastes; and ○ Cleaning up areas of spillage of potentially contaminating liquids and solids. 		
Groundwater	Decanting	<p>After mine closure and ceasing of dewatering, pit is likely to decant. Once the mine starts to decant, it is not expected to stop naturally. Pollution from WRDs on groundwater quality will continue in perpetuity, even after mine closure.</p> <p>Seepage and decant is expected to have a serious impact and require management and rehabilitation measures to prevent irreplaceable impacts. If the pH is acidic, dissolved metals and sulphates will remain in solution.</p>	<p>a) Identify decant areas and raise topography to increase time to decant;</p> <p>b) Plan open cast mining so that the perimeters follow the surface contours along the lowest side of the pit and not cut directly across streams;</p> <p>c) Monitoring groundwater levels, decant rates and qualities;</p> <p>d) Revegetate WRD as quickly as possible to minimize recharge rates;</p> <p>e) Divert all clean runoff away from the pit through a series of berms;</p> <p>f) Re-evaluate impact of decant after end of life, once monitoring information is available; and</p> <p>g) Treat seepage and decanted water using passive or active means to meet the recommended standards.</p>	<p>Dangerous goods stored and managed as per SANS 10228:2006 and MSDs and MPRDA Regulations. MSHA will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.</p>	<p>Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.</p>

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Surfacewater	Mine rehabilitation	Pollution of surrounding watercourses as a result of activities during the decommissioning phase	<p>a) The perimeter stormwater management measures should remain in place and should only be removed once rehabilitation of other activities has been completed. This will capture most of the sediment produced from rehabilitation activities and any spills from removal of hydrocarbon and chemical storage;</p> <p>b) Credible contractors should be used for the cessation of the mining and decommissioning of all infrastructure.</p>	Dangerous goods stored and managed as per SANS 10228:2006 and MSDs and MPRDA Regulations. MHSa will be complied with regarding signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the EMP as soon as hydrocarbons are brought to site for the life of mine.
	Post closure	Rehabilitation of the site post mining will result in a positive impact on surface water quantity when completed.	Rehabilitation will result in a positive improvement as surface water drainage patterns will be restored to a state similar to pre-mining which is likely to result in an improvement in catchment yield after land profiling and cover having been restored		
Traffic Impact	Removal of rubble and other materials from site	Added traffic on the road network	Road network able to support additional trucks.	Mine safety in terms of MHSa and relevant regulations	From day 1 until mine closure
Heritage	Ripping and shaping of compacted areas	Ripping and shaping all compacted areas to be free draining, followed by re-vegetation might expose human remains or archaeological artefacts	<p>a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken</p> <p>b) Education and training on heritage resources will be given to mine employees</p>	Heritage resources act	From construction until closure
Socio-Economic	Mine closure	The impact may be reversible over time as workers and job-seekers leave the area, consequences such as crime and other social pathologies will be permanent	<p>a) Effect retrenchments according to procedures stipulated in approved SLP;</p> <p>b) The Mine's SLP should provide strategies and measures that prevent job loss;</p> <p>c) Support economic diversification through development of alternative markets;</p> <p>d) Develop a Mine Closure Plan;</p> <p>e) Proactively and effectively implement mine closure plan;</p> <p>f) Collaborate with adjacent mining companies to develop and implement sustainable community;</p>	SLP, Mine Charter and Good relations with communities	From construction until mine closure

Environmental Aspect	Activity	Potential Impacts	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> g) Develop alternative and sustainable livelihoods; h) Alternatives to save jobs/avoid downscaling should be investigated beforehand; i) Proactively assess and manage the social and economic impacts on individuals, regions and economies where retrenchment and/or closure of the mine are certain; and j) Partner with the relevant government departments, to jointly manage Closure process 		
Waste management	Mine closure	Waste expected to result from the decommissioning and rehabilitation activities include scrap metals, building rubble, oils, lubricants, paints, solvents, contaminated soils, waste rock dumps and potentially recyclable materials such as steel, wood, plastics, glass and tiles. If stored or discarded on open ground, hydrocarbons will cause soil contamination and possibly groundwater pollution, an impact rated as	<ul style="list-style-type: none"> a) Identify areas of possible soil contamination, sample such areas, analyse and determine degree of soil contamination. Remove and dispose of soil with contamination levels exceeding the prevailing standards/guidelines; b) Sort the remaining wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers; c) Have recyclable wastes removed by responsible recyclers; and d) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfills 	Waste management standards and Regulations	From construction until closure

23.14 Impact Management Outcomes

They have been discussed in Section 14

23.15 Impact Management Actions

They have been discussed in detail in Section 10

23.16 Summary of Environmental Impact Management and Monitoring Actions

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Construction Phase						
Air Quality	Excavations All infrastructure areas, development footprints and associated activities	Remain within the Air Quality Regulations and Dust Regulations standards	Dust emissions due to erosion of open storage stockpiles and exposed areas when the threshold wind speed is exceeded.	<ul style="list-style-type: none"> a) Wet suppression, applied sparingly, to ensure the absence of visible dust; b) Wet suppression is about 50% effective on unpaved roads, but chemical binders such as Dustex or Dust-A-Side may also be used; c) Enforce low vehicle speeds on unpaved areas (<40 km/h); d) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; e) Vegetate the berm and other surfaces that were laid bare as a result of construction with a locally indigenous grass species where practicable, as soon as possible; and f) Requiring contractors to maintain construction vehicles in good condition 	EOO Occupational hygienist	Monthly Monthly Dust Monitoring Report
	Vehicle movement	Same as above	Emissions from the resuspension of loose material on the road surface. Vehicle-entrained dust emissions from the unpaved haul roads within the proposed Kedjona Mining Project mining area potentially represent the most significant source of fugitive dust for the mine	Haul road mitigation measures include tarring or paving, wet suppression and chemical surface treatments. Regular, light watering of the road is needed for water spraying to be effective in reducing particulate emissions. Other surface treatments include the use of chemicals such as calcium chloride or magnesium chloride. These chemicals attract moisture – drawing moisture out of the air during periods of high humidity, and also reducing the evaporation rate of water during hot periods. Some products contain surfactants which act as wetting agents. These not only reduce the amount of water required for wetting the roads, but also have slight binding properties. Another approach to dust control involves the application of organic or synthetic compounds that physically bind the dust particles together. The disadvantage of paving/tarring		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Ecology	Site clearance for establishment or access roads, infrastructure and pit area			infrequent watering and chemical mitigation measures is their inability to prevent material spillage from being re-entrained	ECO	Monthly Alien Management Plan
			Clearing of vegetation	Avoid sensitive areas and implement buffer zones		
			Loss of plant SSC	Limit the footprint area to the pit and infrastructure Avoid areas of remaining indigenous vegetation		
			Displacement of fauna species	Avoid high biodiversity sensitivity areas (natural vegetation, watercourses & wetlands) and comply to prescribed buffer zones		
			Loss of faunal SSC	Avoid areas in which plant species of conservation concern may occur; If some areas cannot be avoided implement rescue of plant species of conservation concern		
Noise Impact	Site clearing	To prevent indiscreet noise levels to surrounding environment	Clearing and stripping of topsoil and vegetation	Earthwork activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem	ECO Occupational hygienist	Monthly Monthly Noise Survey Reports
			Construction of mine infrastructure	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem		
Aquatics Ecology	Site clearance for establishment of access roads, infrastructure and pit area	To minimise impacts on aquatics	Sedimentation as a result of bare areas of soil	a) Sediment trapping berms Stormwater management plans b) Dry season construction	ECO	Monthly Monthly Aquatic Biomonitoring Reports Monthly Water Quality Reports
	Establishment or access roads and crossings structures		Disturbance of watercourse channels and sedimentation	a) Upgrade existing roads and causeways c) Dry season construction		
	Vehicle movement and refuelling	Same as above	Pollution of water resources as result of hydrocarbon spills	a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Soil, Land Use and Land Capability	Transport of materials and labour Earthworks	To preserve quality of topsoil until it is needed for closure	<p>Transport of materials and labour with trucks and buses as well as other light vehicles using the existing access roads. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution</p> <p>Earthworks will include clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling as well as drilling and blasting for the initial removal of overburden at the planned open cast pit as well as the construction of infrastructure like the Primary Crushing Facility, water management systems, contractors camp and sewage treatment plants. These activities are the most disruptive to natural soil horizon distribution and will impact on the current soil hydrological properties and functionality of soil. It will also change the current land use as well as land capability in areas where activities occur and infrastructure is constructed</p>	<p>a) Minimise the footprint of the Kedjona Mining Project</p> <p>The existing pre-construction mine layout and design is aiming to minimise the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible. All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined. This measure will significantly reduce areas to be compacted by heavy construction vehicles and regular activities during the operational phase</p> <p>b) Management and supervision of construction teams</p> <p>The activities of construction contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site. In addition, compliance to these instructions must be monitored</p>	ECO	Monthly
	Handling and storage of building material		This will have the potential to result in soil pollution when not managed properly.	c) Location of stockpiles	ECO	Monthly
	Vegetation clearance		Soil erosion is also anticipated due to vegetation clearance. The impacts of soil erosion are both direct and indirect. The direct impacts are the reduction in soil quality which results from the loss of the nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. The off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation. Soil erosion is a permanent	<p>Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation. Refrain from locating stockpiles as close as possible to the development for cost saving only to have them relocated later during the life of the operation. The ideal is to place all overburden materials removed during construction in their final closure location, or as close as practicable to it</p> <p>d) Topsoil stripping</p>	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			<p>impact for once the resource has been lost from the landscape it cannot be recovered. Although there are off-site indirect impacts associated with this, the impact is mainly considered to be local.</p>	<p>Wherever possible, stripping and replacing of soils should be done in a single action. This is both to reduce compaction and also to increase the viability of the seed bank contained in the stripped surface soil horizons.</p> <p>Stripping should be conducted a suitable distance ahead of development of, for example the open pit, at all times to avoid loss and contamination. As a norm, soil stripping should be kept within 3-9 months of development, or between 50-100 metres ahead of the active operations.</p> <p>e) Stockpiling of topsoil</p> <p>To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 meters maximum. For extra stability and erosion protection, the stockpiles may be benched. The clay content of the topsoil on the largest area of the Kedjona Mining project area is not sufficient for stockpiles to remain relatively stable without benching. The areas on the Arcadia soil form do have sufficient clay content</p> <p>f) Prevention of stockpile contamination</p> <p>Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately</p> <p>g) Terrain stability to minimise erosion potential</p>		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				<p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Using drainage control measures and culverts to manage the natural flow of surface runoff <p>Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly:</p> <ul style="list-style-type: none"> • Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Using drainage control measures and culverts to manage the natural flow of surface runoff <p>h) Management of access and services roads Existing established roads should be used wherever possible. Where possible, roads that will carry heavy-duty traffic should be designed in areas previously disturbed rather than clearing new areas, where possible. The moisture content of access road surface layers must be maintained through routine spraying or the use of an appropriate dust suppressant. Access roads should be designed with a camber to avoid ponding and to encourage drainage to side</p>		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				<p>drains; where necessary, culverts will be installed to permit free drainage of existing water courses. The side drains on the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used</p> <p>i) Prevention of soil contamination During the construction phase, chemical soil pollution should be minimised as follows:</p> <ul style="list-style-type: none"> • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids. 		
Groundwater	Drilling	To prevent deterioration in groundwater quality	<p>Groundwater contamination as a result of drilling of new monitoring boreholes to investigate possible preferred groundwater flow pathways and one or two areas outside preferred pathways, which will:</p> <ol style="list-style-type: none"> Identify geological and hydrogeological control across the proposed mining right area; Provide facilities to undertake aquifer testing and water sample collection; and 	Monthly monitoring of the boreholes with regard to water levels and water quality	ECO	<p>Monthly</p> <p>Monthly Water Quality Reports</p>

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			c) Serve as future monitoring points in an initial groundwater monitoring network.			
	Storage of fuels and lubricants and movement of vehicles	Same as above	Spills from improper storage of fuels and lubricants and also from leaking vehicles	<ul style="list-style-type: none"> a) Monthly monitoring of the boreholes with regard to water levels and water quality b) Place drip trays under vehicles when parked. c) If in-field refuelling is done from a tanker, it should be done in a designated dirty area and a spill kit and clean-up team must be available on site; d) Spillages should be cleaned up immediately and contaminated soil must either be remediated in situ or disposed of at an appropriately licensed landfill site; e) Hydrocarbon storage areas must be in a bunded area and comply with the relevant SANS standards 	ECO	Monthly
Surface Water	Exposure of topsoil	To prevent pollution of surface waterbodies	Sedimentation of watercourses due to exposing and loosening of soil as a result of vegetation clearing for the construction of infrastructure and pollution of watercourses due to hydrocarbon and chemical spillages	<ul style="list-style-type: none"> a) Use wet suppression, chemical stabilization and wind speed reduction methods that should be used to control open dust sources at the construction sites b) Vegetation should only be removed where absolutely necessary; c) Hydrocarbons should be stored on hard park bunded facilities to ensure that all spillages are contained; and d) Clean and dirty surface water trenches/channels should be constructed to divert runoff separately to appropriate storage facilities 	ECO	Monthly Monthly Water Quality Reports
	Vegetation removal	Same as above	Altered drainage paths and loss of catchment yield due to the removal of	Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			vegetation and construction of diversion berms	water to acceptable standards and then to discharge to the catchment.		
Traffic	Transportation of materials and labourers	Minimise congestion in access roads and intersections	Construction materials being transported to site will contribute to the addition of traffic on the road network	Road network able to support additional trucks.	ECO	Monthly
			Employees and labourers transported to/from site	Road network able to support additional commuter trips		
			Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).		
Heritage	Site clearance	To prevent destruction of artefacts should they be unearthed.	Site Clearance for construction activities might reveal or expose archaeological artefacts.	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken b) Education and training on heritage resources will be given to mine employees	ECO	Monthly
Socio-Economic	Construction activities	To create employment opportunities for the local communities	The residual impacts associated with the creation of employment and business opportunities and training during the construction phase is that the workers can improve their skills by gaining more experience.	a) Establish targets for the employment and training; b) Train workforce for longer term employment; c) Adopt recruitment strategies that ensure local people are given employment preference; d) Effective implementation of training and skills development initiatives; e) The recruitment process has to be transparent and equitable; f) Maximise and monitor local recruitment; g) Consult local labour recruitment offices; h) Prevent nepotism/corruption in local recruitment structures; i) Promote employment of women and youth; j) Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and k) Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force	ECO	Monthly Annual SLP Review Report
			Multiplier impacts on the local economy	a) Development of a register of local SMMEs;		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				<ul style="list-style-type: none"> b) Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; c) SMME skills development as part of mine SLP/LED commitments d) Create synergies with other mining/electricity enterprises LED/CSR projects e) Preference should be given to capable subcontractors who based within the local municipal area; f) Align skills development to build capacity of SMMEs; g) Monitoring of sub-contractors procurement; h) Development of a register of local SMME; and i) Local procurement targets should be formalised in Kedjona Mining's procurement policy 		
			<ul style="list-style-type: none"> a) Improved economic development; b) Increased capacity to develop and maintain livelihood strategies 	<ul style="list-style-type: none"> a) Ensure that there is stakeholder buy-in; b) Aligning LED projects with those of other development role-players; c) Liaison with beneficiaries to ensure needs are met; d) Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones; e) Expanding its skills development and capacity building programmes for non-employees f) Monitoring system to regulate Historically Disadvantaged South African procurement g) Where feasible, training should be NQF Accredited; and h) A record of training courses completed per individual should be kept 		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			Increase in injuries and possible loss of lives	<ul style="list-style-type: none"> a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of fly rock on surrounding roads and structure; f) Measures suggested in the Health Impact Assessment to minimize traffic related accidents; g) Traffic calming measures to prevent speeding (e.g. speed humps); h) Road maintenance; i) Provide safe road crossing points and fencing of the main road and the mine site; and j) Community education to sensitize community members to potential traffic and blasting safety risks 		
			Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities; b) Kedjona Mining Mine should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked; c) Measures to prevent deterioration of roads; d) suggested in Traffic Impact Assessment (e.g. drivers to report road deterioration to the NW Province Department of Transport); e) Regulation of traffic at intersections and access roads to the site; f) Road upgrading measures should be investigated and implemented in conjunction with the relevant government department (e.g. repairing and rehabilitating the main roads and sealing the roadway to increase its capacity for Heavy Moving Vehicles); g) Inform communities of planned construction activities that would affect vehicle/pedestrian traffic; h) Ensure that access to key services are uninterrupted by providing alternative access routes in cases where construction activities restricts or disrupt movement 		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				<ul style="list-style-type: none"> i) Construction of cattle crossings at suitable intervals should be incorporated into project design 		
			<ul style="list-style-type: none"> c) Displaced farmworkers; d) Loss of livelihoods 	<ul style="list-style-type: none"> a) Suitable mitigation measures should be defined that protect the farmworkers and ensure that they are adequately provided for and supported should they be moved or lose their employment. b) A Resettlement Action Plan and associated Livelihood Restoration Plan may be required. c) Implement surface lease agreements with all community members who have grazing or ploughing land, this will minimise the impact of economic displacement. d) Implement the Grievance Mechanism to ensure ongoing, proactive engagement and effective management of grievances 		
			Strain on the existing infrastructure which is already inadequate	<ul style="list-style-type: none"> a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Kedjona Mining Project; and d) Liaison with district and local municipalities well in advance to ensure needs are met e) Ensure that municipalities take into account expected population influx f) Promotion of mining methods to allow for surface development g) Influx management h) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders 		
Waste Management	Construction activities	To practise the 3Rs (Recycle, Reuse and Reduce)	Typical wastes produced during construction activities include unused concrete mix, oils, lubricants, paints, solvents, packaging materials, general domestic waste and offcuts of building materials such as steel, wood, glass and tiles. If stored or discarded on open	<ul style="list-style-type: none"> a) Sort the wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers; 	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			ground, hydrocarbons will cause soil contamination and possibly groundwater pollution	<ul style="list-style-type: none"> b) Have recyclable wastes removed by responsible recyclers; and c) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfill 		
Operational Phase						
Air Quality	Drilling and blasting	Monitor emissions concentrations in line with Air Quality Standards and Dust Regulations	Emissions from drilling are a relatively minor component of the overall emission from an open pit mine. The only available emission factor for drilling is a simple uncontrolled TSP emission factor of 0.59kg/hole for overburden (US EPA, 1995). Clearly, other variables such as the depth of the holes, diameter of the holes, and moisture content of the material being drilled would also be relevant and it might be supposed that an emission factor equation should take account of these variables. However, in the absence of other data (and given the relatively minor contribution of this source to overall emissions from mining operations), it is reasonable to accept the 0.59 kg/hole factor for TSP	<ul style="list-style-type: none"> a) Efficiency will be applied to reduce wastage and unnecessary fuel consumption; b) Carbon offsets will be considered if required; c) Concurrent best practice rehabilitation and vegetation monitoring will be applied to allow for the restoration of some the carbon sink functionality within the mining right area. d) Avoid blasting under windy conditions as far as practicable 	ECO Occupational hygienist	Monthly Monthly Dust Monitoring Reports
	Processing plant		The moisture content of the material processed can have a substantial effect on emissions	Surface wetness causes fine particles to agglomerate on, or to adhere to, the faces of larger chunks of ore, with a resulting dust suppression effect. However, as new fine particles are created by crushing and attrition, and as the moisture content is reduced by evaporation, this suppressive effect diminishes and may disappear		
	Vehicle movement			Vehicle entrainment from unpaved roads	<ul style="list-style-type: none"> a) Enforcement of a 40 km/hour speed restriction on unpaved haul roads; b) Wet suppression on haul roads, with the addition of a chemical binder if necessary 	

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
	Crushing and screening		Crushing and screening operations represent significant dust-generating sources if uncontrolled. The large percentage of fines in this dustfall material enhances the potential for it to become airborne. It was assumed that primary crushing (crushing to achieve particles of <300 mm) will take place in the pit to reduce the ore to a transportable size for the conveyor system.	Wet suppression will be used for both the secondary and tertiary crushing stages		
	Materials handling		Materials handling operations which are predicted to result in significant fugitive dust emissions from mining operations include the transfer of material by means of loading and offloading of trucks, loading and offloading conveyors, transfer from one conveyor to another and bulldozing. The quantity of dust which will be generated will depend on various non-climatic parameters such as the nature (moisture content and silt content) and volume of the material handled.	<ul style="list-style-type: none"> a) Reduced tipping and drop heights where practicable; b) Regular clean-up at loading areas and on paved surfaces to prevent entrainment by wind or vehicles; c) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Covering of exposed areas with coarsely crushed rock or aggregate material where practicable; e) Maintaining all vehicles in good condition at all times; and f) Continuous dust and fine particulate monitoring should be implemented to monitor compliance with the NAAQS 		
Ecology	Operation of mine and management of access roads	Confine vegetation clearance and faunal disturbance to mine boundary	<p>Alien plant establishment</p> <p>Disturbance/Displacement of Faunal species</p> <p>Disturbance of vegetation communities</p> <p>Habitat fragmentation</p>	<p>Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p> <p>Minimise footprint area Work only in clearly demarcated areas</p>	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Noise	Operation of processing plant	To minimise intrusive noise levels at all sensitive receptors	Killing of faunal species Noise increase at the boundary of the mine footprint and at the abutting residential	Minimise footprint area Work only in clearly demarcated areas a) All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off. b) Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the boundaries of the plant have not changed	ECO Occupational hygienist	Monthly Monthly Noise Surveys
	Pit activities					
	Hauling of waste rock to the waste dump					
	Hauling of material to the plant					
	Additional traffic					
	Operation of an emergency generator					
Aquatic Ecology	Operation of mine and management of access roads	Prevent contamination of water bodies	Vehicular movement and sedimentation	a) Sediment trapping berms b) Stormwater management plans	ECO	Monthly Monthly aquatic biomonitoring report Water Quality Assessment Reports Annual Water Liability Reports
			Pollution of water resources as a result of mine waste	a) Implement Integrated Waste Water Management Plan b) Aquatic biomonitoring		
			Pollution of water resources as result of hydrocarbon spills	a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site		
Soil, land use and land capability	Open pits and mine infrastructure	To protect soil from contamination; and To preserve as much of the fertility of the topsoil as possible;	Open pits and surface infrastructure will both lead to surface impacts on soil resources. Surface infrastructure like buildings, haul roads, waste rock dumps and product stockpiles are by far the most disruptive to current land uses, land capability as well as agricultural potential	Management of potential soil contamination during the operational phase The following management measures will either prevent or significantly reduce the impact of soil chemical pollution on site during the operation phase:	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
	Spills of fuel and lubricants		<p>of the soil. Soil underneath buildings and stockpiles are subject to compaction and sterilization of the topsoil</p> <p>Soil chemical pollution as a result of spills of fuel and lubricants by vehicles and machinery as well as the accumulation of domestic waste, is considered to be a moderate deterioration of the soil resource. This impact will be localised within the site boundary and have medium-high significance on the soil resource.</p> <p>Vanadium and titanium are unlikely to cause toxic effects for soil microbes or plants due to dust from or soil stockpiles</p>	<p>a) Stockpiles are managed so they do not become contaminated and then need additional handling or disposal;</p> <p>b) A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled;</p> <p>c) Processing areas should be contained and systems designed to effectively manage and dispose of contained stormwater, effluent and solids;</p> <p>d) Storage tanks of fuels, oils or other chemicals stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. Above-ground (rather than in-ground) piping systems should be provided. Containment bunds should be sealed to prevent spills contaminating the soil and groundwater;</p>		
	Vehicle movement		<p>Soil compaction will be a measurable deterioration that will occur as a result of the weight of the topsoil and overburden stockpiles stored on the soil surface as well as the movement of vehicles on the soil surfaces (including access and haul roads). This is a permanent impact that will be localised within the site boundary with medium-low consequence and significance in the mitigated scenario.</p>	<p>e) Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids</p> <p>f) Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors</p>		
	Vegetation clearance		<p>During the operational phase, topsoil stockpiles as well as roads running down slopes will still be susceptible to erosion. Soil surfaces with infrastructure such as concrete slabs and buildings will not be exposed to erosion any longer. This is a permanent impact that will be localized within the site boundary with medium-high consequence and significance. With proper mitigation measures and the embedded controls as recommended in</p>	<p>g) Solids and slurries are disposed of in a manner consistent with the nature of the material and avoids contamination; and</p> <p>h) Effluent and processing drainage systems avoid leakage to ground.</p>		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			the Soil Management Plan, it is anticipated that the significance of this impact will be reduced to low			
Groundwater	Minedewatering	Prevent groundwater contamination and reduction of groundwater levels	Opencast mining of will result in groundwater inflows into the pits, which needs to be pumped out for mine safety. The expected inflow into the pit is 730 m ³ /d when mining floor will reach 20 mbgl. It will stabilise to 1150 m ³ /d when mining floor will reach 90 mbgl	<ul style="list-style-type: none"> a) Store the dewatered water in PODs and ensure that the dams will have enough storage volume; b) If that is not possible, re-introduce treated water into the streams after ensuring that they meet the required standards as per the WUL or river quality objectives; c) Supply equal volumes and better quality water to affected user if proven that there is an impact on specific users; d) Monitoring of groundwater water levels and groundwater inflow rates; and e) Update numerical model annually 	ECO	Monthly Water Quality Assessment Reports Annual Water Liability Reports
	Minewater runoff		Any contamination that will seep from the WRDs is expected to move eastern direction toward the north-north-east down-gradient of the waste dump. The toe of the plume estimated to extend 700 m away from waste dump, 20 years after contamination commences	<ul style="list-style-type: none"> a) Implement compacted clay or synthetic liner underneath the WRDs to minimize seepage following the waste classification result; b) Re-use water collected in the WRDs berms. Any excess should be treated to acceptable quality before it is discharged to the environment; c) Monthly and quarterly monitoring of the surface water and groundwater respectively 		
Surfacewater	Mining activities	Prevent contamination of surface water bodies	Pollution of surrounding water courses as a result of activities during the operational phase (spills, overflows and contaminated runoff)	<ul style="list-style-type: none"> a) There are no mitigation measures for a loss of contained water to the catchment yield as long as the mine is there however; b) Reuse dirty water as much as possible onsite instead of obtaining water from the catchment, or to treat dirty water to acceptable standards and then to discharge to the catchment. - Sustainable mine water management needs to be implemented 	ECO	Monthly Monthly aquatic biomonitoring report Water Quality Assessment Reports Annual Water Liability Reports

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Traffic	Transportation of staff	Ensure worker safety and compliant with road safety signages	Haulage to/ from site; and mine staff to/ from site	Road network able to support additional trucks.	ECO	Monthly
	Dust from vehicle movement		Dust will increase with increased traffic flow along gravel roads	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).		
	Noise from vehicle movement		Noise levels affecting sensitive areas including residential areas	Speed limits to be kept low and define routes away from residential areas.		
Heritage Impact Assessment	Opening of box-cut	Report any suspicion of unmarked graves or artefacts to SAHRA and Provincial Heritage Resource Agency	Opening of the box-cut might expose or reveal archaeological artefacts	<ul style="list-style-type: none"> a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken b) Education and training on heritage resources will be given to mine employees 	ECO	Monthly
Socio-Economic		To implement the conditions of the SLP	The impact may be reversible over time as workers and job-seekers leave the area, consequences such as HIV/AIDS and unwanted pregnancies will be permanent	<ul style="list-style-type: none"> a) Limit, as far as reasonably possible, social ills caused by influx of workers and job-seekers; b) Liaise openly and frequently with affected stakeholders to ensure they have information about the Project; c) Extensive HIV/AIDS awareness and general health campaign. It should be noted that Kedjona Mining Mine has no control over activities related to workers' behaviour; however it is recommended that HIV/AIDS campaigns are conducted within the affected area; d) Discourage influx of job-seekers by prioritising employment of unemployed members of local communities; e) Liaise with Moses Kotane Local Municipality, and Traditional Authority to ensure that expected population influx is taken into account in infrastructure development and spatial development planning; f) Create synergies with local government IDP and other companies' SLP/CSR projects to promote infrastructure development; g) Clear identification of workers - prevention of loitering; h) Liaison with police or establish/ support community policing forum; i) Promote projects providing housing, especially low cost housing, to link with the proposed Kedjona Mining MVT mine; j) Community education; and 	ECO	<p>Monthly</p> <p>Annual SLP Review Report</p>

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				k) Implement measures to address potential conflict between locals and non-locals		
			The increase in nuisance factors and associated changed sense of place will be negative, and direct as a result of Project activities, and indirect as a result of migrant job-seekers	<ul style="list-style-type: none"> a) Minimise all nuisance factors such as noise, air quality, traffic, and visual-Implement all mitigation measures as specified in the relevant specialist studies; b) Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; c) Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors 		
			Strain on the existing infrastructure which is already inadequate.	<ul style="list-style-type: none"> a) To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; b) To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; c) To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Kedjona Mining Project; and d) To make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders 		
			Loss of grazing land	<ul style="list-style-type: none"> a) Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner with the intention to acquire only the required servitude area; b) Should Kedjona Mining MVT Mine acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes – potentially as part of a lease agreement; c) Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be 		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				implemented as part of the decommissioning phase		
			Altered sense of place and breakdown of existing social networks	<ul style="list-style-type: none"> a) Where possible ensure that access to fields and grazing areas are uninterrupted by providing alternative access routes and/or temporary access points during construction activities; b) Kedjona Mining should ensure that residents are kept informed on a day-to-day basis of construction progress and of when access will be blocked 		
			<ul style="list-style-type: none"> a) Developed local economy; b) Increased capacity to develop and maintain livelihood strategies 	Maximise benefits from local employment, skills and economic development		
			Increase in injuries and possible loss of lives	<ul style="list-style-type: none"> a) Access control to all project elements, including fencing; b) Personal Protective Equipment for mine workers; c) Notification of blasting schedules; d) Blasting and storage of hazardous materials to adhere to prescribed regulation; e) Measures suggested minimising the impact of flyrock on surrounding roads and structure; f) Measures suggested in the Health Impact Assessment to minimize traffic related accidents; g) Traffic calming measures to prevent speeding (eg. speed humps); h) Road maintenance; i) Provide safe road crossing points and fencing of the main road and the mine site; and j) Community education to sensitize community members to potential traffic and blasting safety risks 		
Waste management	Mining operations	To prevent contamination of soil and water resources by acid, salts or metals and to practise 3Rs of waste management	In terms of the National Environmental Management Amendment Act 2014, mining residues are classified as wastes and must be managed as prescribed by the National Environmental Management: Waste Act of 2008 and its Regulations GN R632 and R633	<ul style="list-style-type: none"> a) Manage waste in accordance with Regulations GNR634-636 b) Undertake regular inspection and maintenance of waste management facilities; c) Monitor groundwater and surface water quality down-gradient of waste management facilities; and 	ECO	Weekly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				d) Take such corrective action as may be required.		
Decommissioning and Rehabilitation Phase						
Air quality	Demolition of infrastructure	To remain within national standards at site perimeter and at sensitive receptors	Particulate mobilisation can be caused by the demolition of buildings and handling of the rubble, backfilling of the storm water dam and "dirty" water collection channels and ripping and shaping of compacted areas	<ul style="list-style-type: none"> a) Wet suppression during landscaping and materials handling activities; b) Enforcement of low vehicle speeds on unpaved areas (<40 km/h); c) Use of shade cloth where necessary, to reduce wind speeds and reduce travel distance of dust; d) Vegetation of bare surfaces with a locally indigenous grass species as soon as possible; e) Continue dust fall monitoring until vegetation cover is well established; and f) Requiring contractors to maintain construction vehicles in good condition 	ECO	Weekly Dust Monitoring Reports
Ecology	Shaping of landscape	To establish a self-sustaining diversity of local indigenous vegetation	Loss of species of conservation concern	All infrastructure that could have a negative impact on faunal species (powerlines etc) needs to be decommissioned and removed	ECO	Monthly Alien Invasive Species Management Plan
	Revegetation of landscape		Impact on the growth and health of both fauna and flora	Implement rehabilitation strategy and rehabilitation interventions		
	Monitoring of plant species establishment		Establishment of vegetation	Implement rehabilitation monitoring plan and remedy actions		
			Habitat reconstruction	Implement rehabilitation monitoring plan and remedy actions		
			Habitat stabilisation	Implement rehabilitation monitoring plan and remedy actions		
Noise	Backfill of disturbed areas	To avoid intrusive noise levels at sensitive receptors	Noise increase at the boundary of the mine footprint and at the abutting residential	Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.	ECO Occupational Hygienist	Monthly Monthly Noise Surveys
	Planting of grass and vegetation at rehabilitated area			Building activities to be done during daytime working hours unless there is no heavy-duty machinery which may create a noise problem.		
	Maintenance of disturbed area			Maintenance activities to be done during daytime working hours.		

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
Aquatic Ecology	Shaping of landscapes	Prevent contamination of water bodies	Sedimentation as a result of bare areas of soil	<ul style="list-style-type: none"> a) Sediment trapping berms b) Stormwater management plans c) Dry season working d) Aquatic biomonitoring 	ECO	Monthly
	Vehicular and machinery movement		Pollution of water resources as result of hydrocarbon spills	<ul style="list-style-type: none"> a) Service all vehicles and machinery Refuel in hard-park/bunded area Store hydrocarbons safely in bunded area b) Vehicle maintenance and inspection daily c) Spill kits must always be available and ready on-site 		<p>Monthly aquatic biomonitoring report</p> <p>Water Quality Assessment Reports</p> <p>Annual Water Liability Reports</p>
Soil, land use and land capability	Traffic movement	Restore land to its pre-mining state	Transport of materials away from site. This will compact the soil of the existing roads and fuel and oil spills from vehicles may result in soil chemical pollution	<ul style="list-style-type: none"> a) Management and supervision of decommissioning teams <p>The activities of decommissioning contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition, compliance to these instructions must be monitored.</p>	ECO	Monthly
	Earthworks		Earthworks will include redistribution of inert waste materials to fill the open pits as well as topsoil to add to the soil surface. These activities will not result in further impacts on land use and land capability but may increase soil compaction	<ul style="list-style-type: none"> b) Infrastructure removal <p>All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site</p>		
	Handling and storage of materials		Other activities in this phase that will impact on soil are the handling and storage of materials and different kinds of waste generated as well as accidental spills and leaks with decommissioning and rehabilitation activities. This will have the potential to result in soil pollution when not managed properly	<ul style="list-style-type: none"> c) Site preparation <p>Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles</p>		
	Revegetation	With the decommissioning phase, soil surfaces are in the process of being replanted with indigenous vegetation and until vegetation cover has established successfully, all surfaces are still susceptible to potential soil erosion				

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
				<p>d) Seeding and re-vegetation</p> <p>Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated</p> <p>e) Prevention of soil contamination</p> <p>During the decommissioning phase, chemical soil pollution should be minimised as follows:</p> <p>Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;</p> <ul style="list-style-type: none"> ○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; ○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; ○ Containing potentially contaminating fluids and other wastes; and ○ Cleaning up areas of spillage of potentially contaminating liquids and solids. 		
Groundwater	Decanting	Prevent contamination of water bodies	After mine closure and ceasing of dewatering, pit is likely to decant. Once the mine starts to decant, it is not expected to stop naturally. Pollution from WRDs on	<p>a) Identify decant areas and raise topography to increase time to decant;</p> <p>b) Plan open cast mining so that the perimeters follow the surface contours along the lowest side of the pit and not cut directly across streams;</p>	ECO	<p>Monthly</p> <p>Water Quality Assessment Reports</p>

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			<p>groundwater quality will continue in perpetuity, even after mine closure.</p> <p>Seepage and decant is expected to have a serious impact and require management and rehabilitation measures to prevent irreplaceable impacts. If the pH is acidic, dissolved metals and sulphates will remain in solution</p>	<p>c) Monitoring groundwater levels, decant rates and qualities;</p> <p>d) Revegetated WRD as quickly as possible to minimize recharge rates;</p> <p>e) Divert all clean runoff away from the pit through a series of berms;</p> <p>f) Re-evaluate impact of decant after end of life, once monitoring information is available; and</p> <p>g) Treat seepage and decanted water using passive or active means to meet the recommended standards.</p>		Annual Water Liability Reports
Surfacewater	Mine rehabilitation	Prevent contamination of water bodies	Pollution of surrounding water courses as a result of activities during the decommissioning phase	<p>a) The perimeter stormwater management measures should remain in place and should only be removed once rehabilitation of other activities has been completed. This will capture most of the sediment produced from rehabilitation activities and any spills from removal of hydrocarbon and chemical storage;</p> <p>b) Credible contractors should be used for the cessation of the mining and decommissioning of all infrastructure.</p>	ECO	<p>Monthly</p> <p>Monthly aquatic biomonitoring report</p> <p>Water Quality Assessment Reports</p> <p>Annual Water Liability Reports</p>
	Post closure		Rehabilitation of the site post mining will result in a positive impact on surface water quantity when completed.	Rehabilitation will result in a positive improvement as surface water drainage patterns will be restored to a state similar to pre-mining which is likely to result in an improvement in catchment yield after land profiling and cover having been restored		
Traffic Impact	Removal of rubble and other materials from site	To avoid adding to frustration of other road users or compromising road safety	Added traffic on the road network	Road network able to support additional trucks.	ECO	Monthly
Heritage	Ripping and shaping of compacted areas	Report any suspicion of unmarked graves or artefacts to SAHRA and	Ripping and shaping all compacted areas to be free draining followed by re-	a) If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken	ECO	Monthly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
		Provincial Heritage Resource Agency	vegetation might expose human remains or archaeological artefacts	b) Education and training on heritage resources will be given to mine employees		
Socio-Economic	Mine closure	To implement the conditions of the SLP	The impact may be reversible over time as workers and job-seekers leave the area, consequences such as crime and other social pathologies will be permanent	<ul style="list-style-type: none"> a) Effect retrenchments according to procedures stipulated in approved SLP; b) The Mine's SLP should provide strategies and measures that prevent job loss; c) Support economic diversification through development of alternative markets; d) Develop a Mine Closure Plan; e) Proactively and effectively implement mine closure plan; f) Collaborate with adjacent mining companies to develop and implement sustainable community; g) Develop alternative and sustainable livelihoods; h) Alternatives to save jobs/avoid downscaling should be investigated beforehand; i) Proactively assess and manage the social and economic impacts on individuals, regions and economies where retrenchment and/or closure of the mine are certain; and j) Partner with the relevant government departments, to jointly manage Closure process 	ECO	<p>Monthly</p> <p>Annual Review of SLP</p>
Waste management	Mine closure	To prevent contamination of soil and water resources by acid, salts or metals and to practise 3Rs of waste management	Wastes expected to result from the decommissioning and rehabilitation activities include scrap metals, building rubble, oils, lubricants, paints, solvents, contaminated soils, PCD dam silt and liners, waste rock dumps and potentially recyclable materials such as steel, wood, plastics, glass and tiles. If stored or discarded on open ground, hydrocarbons	<ul style="list-style-type: none"> a) Identify areas of possible soil contamination, sample such areas, analyse and determine degree of soil contamination. Remove and dispose of soil with contamination levels exceeding then prevailing standards/guidelines; b) Remove silt, synthetic liners and contaminated non-synthetic liner materials from PCD and dispose at appropriately licenced landfill. Liner materials and building rubble with 	ECO	Weekly

Environmental Aspect	Activity	Objective	Potential Impacts	Mitigation Measures	Responsible Person	Monitoring Frequency and Reports
			will cause soil contamination and possibly groundwater pollution, an impact rated as	<p>contamination levels below prevailing standards/guidelines may be backfilled into the last portion of the open cast void;</p> <p>c) Sort the remaining wastes and store in separate skips or other containers for hydrocarbons, recyclable materials and non-recyclable materials. Recyclable materials should be sorted into wood, steel, glass, plastic, paper and used oil, and stored in separate containers;</p> <p>d) Have recyclable wastes removed by responsible recyclers; and</p> <p>e) Have non-recyclable wastes removed by reputable contractors for disposal at appropriately licensed landfills</p>		

24 FINANCIAL PROVISION

24.1 Closure Objectives

Closure objectives identified in this report include:

a) Topography

- To ensure that the final elevation will result in the continuation of the pre-mining surface drainage pattern, albeit that topographical changes on site, such as the mine residue facility, will be altered permanently.

b) Soil, Land Capability and Land Use

- To ensure that soil types are replaced in correct sequence, subsoil followed by topsoil, and at appropriate depths.
- To ensure post-mining land capability is at least similar to pre-mining which is grazing and some arable lands.
- To ensure that the land capability is self-sustaining.
- To ensure that pre-mining land uses can continue.

c) Surface Water

- To ensure that no dirty water from the site enters the surrounding surface water systems.
- To maintain flow in downstream rivers to prevent deterioration of downstream ecological status.

d) Groundwater

- To ensure that possible plumes originating from the mining areas do not impact significantly on the surface water features or surrounding users' boreholes.

- To ensure that groundwater users that are impacted have alternative sustainable water sources of the similar quality and quantity.

e) Flora and Fauna

- To ensure that vegetation growth and cover on the rehabilitated areas is sustainable.
- To ensure that alien invasive growth is eradicated until the closure certificate is granted.
- To encourage surrounding animals to return into the rehabilitated areas to maintain the surrounding biodiversity.

f) Aquatic Ecosystems

- To ensure that aquatic ecosystems are maintained as close as possible to that of the pre-mining environment.

g) Wetlands

- To minimise the disturbance on wetlands.
- To ensure that the adjacent wetland conditions are similar to that of the pre-mining Present Ecological State.

24.2 Confirm Specifically That the Environmental Objectives in Relation to Closure Have Been Consulted with Landowner and Interested and Affected Parties.

All registered I&APs and landowners were invited to comment on this draft EIR. Furthermore, this draft EIA/EMPr is available to I&APs and landowners for a 30-day review period.

24.3 Calculate and State the Quantum of the Financial Provision Required to Manage and Rehabilitate the Environment in Accordance with The Applicable Guideline.

The closure costs of the aspects linked with the project have been determined using the Mineral Resources (DMR) Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provisions Provided by a Mine (2005). The closure costs are based solely on the premature closure of Mining Area only, as this would be the only area that would have been impacted upon within one year of operation.

The approach to calculating the closure quantum as specified in the DMR Guideline is summarised as follows and is reported in Table 2-2 of the guideline:

- a) Step 1: Determine the Mineral Mined which.
- b) Step 2A: Determine Primary Risk Class.
- c) Step 3: Determine Environmental Sensitivity has been determined by reference to Table B.4 of the DMR Guideline
- d) Step 4.1: Determine level of information
- e) Step 4.2: Determine the closure components and associated rates –the rates have been escalated with the Consumer Price Index since the inception of the guidelines.
- f) Step 4.3: Determine the unit rates for closure components. The rates used in the assessment are based on the original 2005 rates included in the guideline, with these rates inflated by the Consumer Price Index (CPI).
- g) Step 4.4: Determination of weighting factors:
 - o Weighting Factor 1: The nature of the terrain where the operation is located.
 - o Weighting Factor 2: The proximity of the operation to an urban centre.
- h) Step 4.5: Identify areas of disturbance as illustrated in **Table 34**

Table 34: Areas of disturbance

Infrastructure	Year 1 of Operation
Pit Rehabilitation	
Open Pit Rehabilitation	10
Rehabilitation of Overburden and Spoils	
Overburden Dump & ROM Stockpile	58
Demolition of Steel Buildings and Structure	
Plant Area	0,06
Demolition of Dams	
Non-Polluting Dams	0,5
Demolition of Reinforced Concrete Buildings and Structures	
Mine Infrastructure/Mine Office	0,658
Rehabilitation of Access Roads	
Haul Roads and Access Roads (333,3 X 15=5000m ²)	0,5
Total Area ha	69,718

- i) Step 4.6: Identify closure costs from Specialists.
- j) Step 4.7: Proposed closure costs for the Project as indicated in **Table 35**.

Table 35: Quantum Calculation

	Closure Component	CLOSURE COST				
		Applicable	Quantity	Unit	Unit rate	Total cost
	Kedjona Mining					
1	Infrastructural Areas					
1,1	Dismantling of processing plant and related structures					
1.1.1	Includes overland conveyors	Yes	600	m3	R 14,05	R 8 430,00
	Sub-total for Dismantling of processing plant and related structures					R 8 430,00
1,2	Demolition of steel buildings					
1.2.1	Demolition of steel buildings	Yes	5000	m3	R 195,76	R 978 800,00
	Sub-total for Demolition of steel buildings					R 978 800,00
1,3	Demolition of other buildings and structures					
1.3.1	Security building and change house					
	Housing and Administration Facilities	Yes	160	/m2	R 391,53	R 62 644,80
1.3.2	Workshop					
	Shed-type steel structure	Yes	160	/m2	R 288,49	R 46 158,40
	Concrete base	Yes	160	/m2	R 288,49	R 46 158,40
1.3.3	Offices					
	Single storey brick structure	Yes	360	/m2	R 391,53	R 140 950,80
1.3.4	Guard room					
	Single storey brick structure	Yes	25	/m2	R 391,53	R 9 788,25
1.3.5	Overland powerlines					
	Major powerlines	Yes	3000	/m	R 14,05	R 42 150,00
1.3.6	Transformer area					
	Substation	Yes	30	/m2	R 288,49	R 8 654,70
1.3.7	Carport					
	Parking area	Yes	144	/m2	R 391,53	R 56 380,32
1.3.8	Building					
	Single storey brick structure	Yes	15	/m2	R 391,53	R 5 872,95
1.3.9	Guardhouse to ROM area					
	Single storey brick structure	Yes	24	/m2	R 391,53	R 9 396,72
1.3.10	Fencing					
	Remove security fencing	No		/m		R -
	Erect stock fencing	Yes	2500	/m	R 123,64	R 309 100,00
	Sub-total for Demolition of other buildings and structures					R 737 255,34
1,4	Rehabilitation of roads and paved surfaces					
1.4.1	Hard stand	Yes	2000	/m2	R 35,03	R 70 060,00

1.4.2	Main access road	Yes	3000	/m2	R 35,03	R 105 090,00
	Sub-total for Rehabilitation of roads and paved surfaces					R 175 150,00
	Sub-total for Infrastructural Areas					R 1 899 635,34
2	Mining Areas					
2,1	Open pit rehabilitation including final voids and ramps					
2.1.1	Opencast rehabilitation	Yes	10	ha	R 205 242,16	R 2 052 421,60
	Sub-total for Open pit rehabilitation including final voids and ramps					R 2 052 421,60
	Sub-total for					R -
2,3	Rehabilitation of stockpiles and processing residues					
2.3.1	Overburden and Spoils Rehabilitation	Yes	70	ha	R 136 828,10	R 9 577 967,00
	Sub-total for Rehabilitation of stockpiles and processing residues					R 9 577 967,00
2,4	Rehabilitation of clean water impoundments					
2.4.1	Rehabilitation of processing waste deposits and evaporation ponds (Non-polluting)	No	0,5	ha	R 170 416,93	R 85 208,47
	Sub-total for Rehabilitation of clean water impoundments					R 85 208,47
	Sub-total for					R -
2,5	Rehabilitation of subsided areas					
2.5.1	Shaping and levelling of stockpile and other infrastructural footprint areas	Yes	70	/ha	R 77 303,67	R 5 411 256,90
2.5.2	Vegetation of disturbed areas	No	0	/ha	R 8 258,56	R -
	Sub-total for Rehabilitation of subsided areas					R 5 411 256,90
	Sub-total for Mining Areas					R 17 126 853,97
3	General Surface Rehabilitation					
3,1	General Surface Rehabilitation					
3.1.1	Rip to alleviate compaction of stockpile and infrastructural footprint areas	Yes	58	/ha	R 108 390,94	R 6 286 674,52
	Sub-total for General Surface Rehabilitation					R 6 286 674,52
3,2	Other surface disturbances					
3.2.1	Plant Area	Yes	1	ha	R 108 390,94	R 108 390,94
	Sub-total for Other surface disturbances					R 108 390,94
	Sub-total for General Surface Rehabilitation					R 6 395 065,46
	Sub-total for Sub-total for River diversions and watercourse reinstatement					R -
	Sub-total for Runoff Management					R -
	Sub-Total 1 (for infrastructure and related aspects)					R 25 421 554,77
4	P&Gs, Contingencies and Additional Allowances					
4,1	Preliminaries and general	Yes	10	/sum	R 2 542 155,48	R 2 542 155,48
4,2	Contingencies	Yes	10	/sum	R 2 542 155,48	R 2 542 155,48

4,3	Additional studies	Yes	1	sum	R 80 000,00	R 80 000,00
Sub-Total 2 (for Additional Allowances)						R 5 164 310,95
5 Pre-site Relinquishment Monitoring and Aftercare						
5,1	Water Management	Yes	4	ha	R 41 213,28	R 164 853,12
5,4	Care and maintenance of rehabilitated areas	Yes	60	ha	R 14 424,65	R 865 479,00
Sub-Total 3 (for Post-Closure aspects)						R 1 030 332,12
Grand Total Excl. VAT. (for Sub-total 1 +2 +3)						R 31 616 197,84

Kedjona Mining						
Closure components				Closure Costs		
1	Infrastructural aspects					R 1 899 635
2	Mining aspects					R 17 126 854
3	General surface rehabilitation					R 6 395 065
4	Reinstatement of drainage lines					R -
Sub-Total 1						R 25 421 555
5 Post-Closure Aspects						
5,1	Water Management					R 164 853
5,2	Care and maintenance					R 865 479
Sub-Total 2						R 1 030 332
6 Additional Allowances						
6,1	Preliminary and general					R 2 542 155
6,2	Contingencies					R 2 542 155
6,3	Additional studies					R 80 000
Sub-Total 3						R 5 164 311
Grand Total Excl. VAT. (Sub-total 1 +2 +3)						R 31 616 197,84

24.4 Confirm that the Financial Provision Will Be Provided as Determined.

Financial Provision, to the amount of **R 31,616,197.84** be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

25 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON, INCLUDING:

25.1 Monitoring of Impact Management Actions

Refer to Section 23.16

25.2 Monitoring and reporting frequency

Refer to Section 23.16.

25.3 Responsible persons

Refer to Section 23.16

25.4 Time period for implementing impact management actions

Refer to Section 23.15

25.5 Indicate The Frequency Of The Submission Of The Performance Assessment Report.

The Environmental Performance Report will be submitted to the DMR after every 2 years

26 ENVIRONMENTAL AWARENESS PLAN

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

26.1.1 Training Needs

A training needs analysis is to be performed through all levels of the organization including those within the administration, plant and mining worker sectors. Each of the categories / levels of the organization have different responsibilities and roles, accordingly, different knowledge requirements are applicable. A training needs analysis is to be performed through all levels of the organization including those within the administration, plant and mining worker sectors. Each of the categories / levels of the organization have different responsibilities and roles, accordingly, different knowledge requirements are applicable.

26.1.2 General Awareness Training

The Human Resources Development (HRD) Manager, together with the SHE Manager, will be responsible for the development of, or facilitating the development of, the required general SHE induction and awareness training. A general environmental awareness training module will be developed and integrated into the general induction programme. The general awareness training must include the Environmental Policy, a description of the environmental impacts and aspects and the importance of conformance to requirements, general responsibilities of Kedjona Mining personnel and contractors with regard to the environmental requirements and a review of the emergency procedures and corrective actions; and

A Training Practitioner or the Environmental Officer (EO) will conduct the general awareness training. The training presenter will keep a record of the details of all persons attending general

awareness training. Such attendance registers shall indicate the names of attendants and their organisations, the date and the type of training received.

26.2 Manner In Which Risks Will Be Dealt With In Order To Avoid Pollution Or The Degradation Of The Environment.

Training will address the specific measures and actions as listed in the EIA and EMP. In this way each staff member will be provided the knowledge required for their job to firstly prevent impact and secondly identify if an impact is likely to occur and then to report the possibility of risk or impact immediately so as to ensure immediate response.

The following is a list of the most likely potential environmental emergencies, followed by basic summary of procedures (mine will develop detailed SOPs, which will incorporate detailed requirements under the MPRDA Regulations, for emergency events:

- a) Fires
- b) Chemical/hydrocarbon spill or leak
- c) Explosions

In the case of environmental emergencies, the remedial measures and actions as listed in the Emergency Response Plan should be followed, in addition the relevant authorities should be contacted

26.2.1 Fire

Veld fires and fires resulting from other sources must be handled with extreme caution. Fire extinguishers should be placed around the mine at accessible locations and needs to be frequently inspected and maintained in working condition. The following procedures apply in the event of a fire:

- a) An alarm should be activated to alert all employees and contractors.
- b) Identify the type of fire and the appropriate extinguishing material. For example, water for a grass fire, and mono ammonium phosphate-based fire extinguisher for chemical and electrical fires.

- c) In the event of a small fire, the fire extinguishers placed around the mine should be used to contain and extinguish the fire.
- d) In the event of a large fire, the fire department will be notified.
- e) All staff will receive training in response to a fire emergency on site, including evacuation procedures.
- f) A Fire Association should be set up with the mine and surrounding landowners to facilitate communication during fire events and assist in fighting fires, where necessary. If such an association exists, then the mine will join such an association.
- g) If possible, all surrounding drains, such as storm water drains need to be covered and or protected to prevent any contaminated water from entering the drains.
- h) In case of a chemical or petroleum fire, run-off from the area should be contained as far as possible using the most appropriate measures e.g. spill absorbent cushions, sand or a physical barrier.
- i) Contaminated run-off must be diverted into an oil sump or cleaned up.

26.2.2 Hydrocarbon/Chemical Spill

Hydrocarbons such as diesel, petrol, and oil, which are used as fuel for mine machinery will be kept on site; therefore, there is the possibility that spillage may occur. Further, any chemicals contained on site, such as those associated with explosives may also be detrimental to the environment if spills occur. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment. The following procedure applies to a hydrocarbon/chemical spill:

- a) The incident must be reported to the Environmental coordinator immediately.
- b) The Environmental Coordinator will assess the situation from the information provided and set up an investigation team. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident.
- c) When investigating the incident, priority must be given to safety.
- d) Once the situation has been assessed, the Environmental Coordinator must report back to the Mine Manager.

- e) The Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible, any remediation measures that can be taken.
- f) In the event of a small spillage, the soil should be treated in situ, using Hazmat clean up kits and bioremediation.
- g) Every precaution should be taken to prevent the spill from entering the surface water environment.
- h) In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of booms and absorbent materials, will be made available and if required, a specialised clean-up crew will be called in to decontaminate the area. The soil should be removed and treated at a special soil rehabilitation facility.
- i) Reasonable measures must be taken to stop the spread of spills and secure the area to limit access.
- j) Dispatch necessary services.

26.2.3 Explosion

Other than explosion incidents related to mining, explosions can occur in the workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance. The procedure to be followed is:

- a) Safe evacuation routes should be devised in the event of an uncontrolled explosion and all staff trained on relevant evacuation routes and assembly points.
- b) Once safe to do so, first responders may provide first aid to injured parties.
- c) All relevant emergency response units must be notified, and hospitals informed of incoming patients.

DMR to be notified of the incident.

27 IMPLEMENTATION PLAN

It is recommended that the EMP be implemented and monitored through regular audits conducted by an independent environmental practitioner. It is suggested that the audits be

conducted annually, starting from the commencement of the mining operations up to rehabilitation phase. The audit reports must be submitted to the competent authority.

27.1 Responsibility for EMPr Implementation

Kedjona Mining remains ultimately accountable for the site and remains liable for any environmental damage caused by activities undertaken on the site. It is from this point of view that Kedjona Mining sets out a range of requirements in terms of the management of the environmental aspects for the site, to which Contractors must adhere as a prerequisite to their appointment.

It is the responsibility of Kedjona Mining to ensure that the principles of integrated environmental management, in terms of the requirements of Chapter 5 of NEMA, are implemented and maintained on the site and that environmentally sustainable practices are undertaken on the site. Kedjona Mining has to ensure that an approved EMPr and the conditions of the Environmental Authorisation (EA) be supplied to the Contractor for the activities undertaken on the site and also monitor the Contractor's compliance to the requirements set out in the EMPr and EA and take disciplinary action for non-compliance.

28 UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&APs;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant;
and
- d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;



Signature of the EAP DATE:

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