



**mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

## **ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**And**

## **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE CHROME ORE WASTE MANAGEMENT LICENCE**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 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).

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**FILE REFERENCE NUMBER SAMRAD:** LP 30/5/1/2/3/2/1 (10104)



## EXECUTIVE SUMMARY

Environmental Management Assistance (Pty) Ltd has been appointed as the independent EAP to manage the EIA process according to the 2014 EIA regulations (GN R.982) on behalf of the applicant.

BCR Minerals (Pty) Ltd (the applicant) has applied for an opencast chrome mine, hereafter referred to as the Spitsvale Mine, situated on Portions 8 and 22 of the farm Kennedy's Vale 361 KT and Portion 24,25,26 and 28 of the farm Spitskop 333 KT, south west of Steelpoort, Limpopo. An Environmental Authorisation (EA) was granted on the 24 October 2016 for the following listed activity:

Activity 17 of GN.R. 984: *"Any activity which requires a mining right as contemplated in section 22 of the Mineral Resources and Petroleum Development Act (MPRDA), 2002 (Act no. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the MPRDA."*

The submission of this report is in compliance with the EIA regulations stipulated in GN R. 982 of the National Environmental Management Act, 1998 (Act no. 107 of 1998), the National Environmental Management Waste Act, 2008 (Act no 59 of 2008), and the Mineral and Petroleum Resources Development Act, 2002 (Act no. 28 of 2002), as amended.

BCR Minerals (Pty) Ltd currently operates a prospecting and bulk sample operation and is the registered holder of the rights to chrome and associated minerals on the properties listed. However, BCR Minerals (Pty) Ltd is not the registered owner of the surface rights of the abovementioned portions although they are in the process of acquiring a portion of portion 22 of the farm Kennedy's Vale 361 KT. The surface rights on portion 22 of Kennedy's Vale 361 KT are registered in the name of Rhodium Reefs, which is a subsidiary of Eastern Platinum Limited and the relevant portions (Portion 24, 25, 26 and 28) of the farm Spitskop 333 KT are registered in the name of the Dithamaga Trust. Glencore is the registered owner of Portion 8 of Kennedy's Vale.

The proposed mining activity relates to the mining of chromitite and associated minerals, covering an extent of not more than 355 ha, on the properties mentioned and in particular the MG0, MG1, MG2, MG3 and MG4 Package chromitite seams. Mining will be undertaken by open cut methods (drilling, blasting, and excavating ore material) whereafter the raw sorted ore will be transported in bulk to various markets.

The scope of work requires investigating all potential environmental and social impacts associated with the waste management activities that may have a detrimental impact on the environment in terms of GN. R. 633 and GN. R. 921 of the National Environmental Management Waste Act, Act 59 of 2008 (NEMWA).



The following waste management activities are associated to the application:

- Category A Listed Activity 1 of GN. R 921: *“The storage of general waste in lagoons”*
- Category B Listed Activity 11 of GN. R 633: *“The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the MPRDA”*

The following definitions have reference:

**“Lagoon”** means the containment of waste in excavations and includes evaporation dams, earth cells, sewerage treatment facilities, and sludge farms.

**“Residue stockpile”** means any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, beneficiation plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or production right.

**“Residue deposit”** means any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right.

This two part document includes all specialist studies required to identify the potential environmental impacts associated with the management of residue stockpiles as defined by the MPRDA. This document will be submitted to the Limpopo DMR in support of BCR Minerals (Pty) Ltd Spitsvale Mine Mining Right Application (MRA).

The objectives of this report are as follow:

- Comply with the legal requirements of the MPRDA and NEMA (Chapter 5 of the Act and GN R. 982);
- Describe the proposed projects-specific environmental and socio-economic context;
- Develop a detailed understanding of the baseline environment at the sites proposed associated to the mining development and waste management sites;
- Determine and assess the impacts to receptors and resources as a result of Project activities;
- Introduce stakeholders to the additional activities of the Project and provide information about the proposed Project in a transparent way;
- Identify and engage with stakeholders to ensure that feedback on the results of the study is provided and that the assessment and management of impacts is identified and concerns considered;
- Develop an environmental and social management measures to mitigate negative impacts and enhance positive impacts;
- Consider and assess Project alternatives in terms of environmental impacts; and



- Provide sufficient information to the authorities to inform the mining authorisation decision.

An investigation of the alternatives was limited by the specifics of this application, so the preferred layout plan/stockpile footprints were determined by the findings and recommendations of the relevant specialist assessments.

A number of specialist studies were carried out as part of our investigation. From the reports and the impact assessment of associated activities a number of sensitive environmental and social receptors have been identified.

The following important factors must be considered:

- The proposed mining site is situated within and in close proximity to the Sekhukhune centre of endemism. Therefore conservation of the surrounding terrestrial biodiversity must form part of the decision outcome.
- Location of infrastructure within the proximity of natural water resources.
- Close proximity of the Dithamaga trust and Tubatse residential estate as social sensitive receptors. This would require extensive monitoring of air quality, noise quality, and water quality.
- A number of heritage sites (including homestead sites, informal burial sites, and industrial/infrastructure heritage sites) have been identified that will be affected by the proposed mining development.
- Loss of agricultural land due to opencast mining is a temporary loss which can be mitigated by appropriate backfilling and replacement of stockpiled topsoil. If done correctly, most of the original agricultural potential can be restored.
- When surveying the area to be rehabilitated and generating a digital terrain map, preferential seepage pathways must be identified and contoured to prevent surface water runoff from creating erosion during a 1:100 year rainstorm event defined as having a rainfall intensity of 20 mm/hr.
- The Waste classification report (**Appendix V**) categorised the residue stockpiles or material (overburden/waste rock) as a falling between a Type 3 ( $LCT_0 < LC \leq LCT_1$  and  $TC \leq TCT_1$ ) and Type 4 ( $LC \leq LCT_0$  and  $TC \leq TCT_0$ ) waste.
- After determining the classification it has been proposed that a Class D Landfill Engineering Design will be required as per GN. R. 636.

It is clear from the assessment results highlighted in this report that there will be a number of impacts that pose a **high negative significant** impact. However if the mitigation measures proposed in Part B (EMPr) of this report are implemented, monitored and audited throughout the life cycle of the Spitsvale Mine, the impacts can be mitigated to a **medium/low negative significant** impact or avoided all together.

A number of recommendations are made to be included in the Waste Management Licence (WML). These recommendations include, but are not limited to, the following:



- All comments and concerns raised by the registered I&AP must be considered and incorporated into the final EIR and EMPr;
- The Spitsvale Mine Rehabilitation, Closure and Liability plan attached as **Appendix U** must be considered as the **first draft** and a living document. A number of assumptions, gaps and uncertainties were identified during the preparation of this report. It is recommended that it be reviewed. As highlighted in **Part A section q)ii)(2)**; upon being granted authorisation for the proposed mining activities, the holder of the authorisation shall compile a final Annual Rehabilitation plan and a Risk Assessment plan as specified by GNR 1147 for approval by the competent authority;
- If any changes to the site layout plan should occur, this plan must be submitted to the DMR for review. In addition to the changes of the site layout, should additional listed activities (in terms of section 24 of NEMA) be triggered, the process as described in Chapter 5 of GNR 982 must be implemented;
- The residue stockpiles must comply with the recommended engineering designs as per GN.R. 636;
- Conditions stipulated in the final EMPr and closure plan must be adhered to;
- Conditions stipulated in all other permits or authorisations must be implemented; and
- All recommendations made in the EIR and specialist studies must be implemented and considered in the finalisation of the site layout plan and operational design of the proposed mining development.



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### REVISION AND APPROVAL

<b>Revision number:</b>		03	
<b>Environmental Management Assistance (Pty) Ltd (EMA) ref:</b>		BCR Minerals Project	
<b>Title:</b>		Environmental Impact Assessment Report and Environmental Management Programme Report for the Spitsvale Mine situated at Spitskop 333 KT (Ptn. 24, 25, 26, and 28) and Kennedy's Vale 361 KT (Ptn. 8 and 22), South West of Steelpoort in Limpopo Province	
<b>Reviewers</b>			
	<b>Name</b>	<b>Digital Signature</b>	<b>Date</b>
<b>Author</b>	<b>Anandi Alers</b> <i>MSc Geography and Environmental Management</i>  <b>EAP</b> <i>Candidate Natural Scientist (600016/14) and a professional member of IAIAA</i>		20/01/2017
<b>Document reviewer</b>	<b>Justin Bowers</b> <i>M Tech</i>  <b>Main Member and senior Consultant at Ecoleges</b> <i>Pri.Sci.Nat and M.G.S.S.A.</i>		20/01/2017
<b>Document Authorisation</b>	<b>Taryn Bigwood</b> <i>Masters</i>  <b>EMA Director</b> <i>Member of LaRSSA, SAAG and IAIAA</i>		20/01/2017
<b>Applicant Authorisation</b>	<b>Walter Murray</b>  <b>Managing Director at BCR Minerals (Pty) Ltd</b>		30/01/2017



## LIST OF ABBREVIATIONS & ACRONYMS

- DMR** – Department of Mineral Resources
- EA** – Environmental Authorisation
- EAP** – Environmental Assessment Practitioner
- EIA** – Environmental Impact Assessment
- EIR** – Environmental Impact Report
- EMA** – Environmental Management Assistance (Pty) Ltd
- EMPr** – Environmental Management Programme
- GTM** – Greater Tubatse Municipality
- IDP** – Integrated Development Plan
- LED** – Local Economic Development Strategy
- MG** – Middle group
- MPRDA** – Mineral and Petroleum Resources Development Act, Act 28 of 2002
- NEMA** – National Environmental Management Act, Act 107 of 1998
- NEMWA** – National Environmental Management Waste Act, Act 59 of 2008
- PPP** – Public Participation Process
- ROM** – Run of Mine
- SPV** – Spitsvale Mine
- WML** – Waste Management Licence



## 1. 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 the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

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

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

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

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



## 2. OBJECTIVES OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objectives of the environmental impact assessment process are to, through a consultative process—

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe 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 the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
  - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - (ii) degree to which these impacts—
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources, and
    - (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) Identify residual risks that need to be managed and monitored.



## PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

### 3. Contact Person and correspondence address

Environmental Management Assistance (Pty) Ltd has been requested to complete the Scoping and EIA process associated to the application for the licensing of a Waste Management Activity in terms of the National Environmental Management: Waste Act, Act no. 59 of 2008 (NEMWA) to the Limpopo Department of Minerals and Resources (DMR) on behalf of BCR Minerals (Pty) Ltd (applicant) for the Spitsvale Chrome Mine situated in the Greater Tubatse Municipality, Limpopo.

#### a) Details of

##### i) Details of the EAP

<b>Name of the Practitioner:</b>	Environmental Management Assistance (Pty) Ltd
<b>Contact person:</b>	Anandi Alers
<b>Tel No.:</b>	+27 (0) 72 604 0455
<b>Fax No. :</b>	+27 (0) 86 226 7324
<b>E-mail address:</b>	anandi.alers@emassistance.co.za

##### ii) Expertise of the EAP

Environmental Management Assistance (Pty) Ltd (EMA) has appointed Mrs. Anandi Alers (Candidate Natural Scientist, level A - 600016/14) as the junior EAP to manage the application process on behalf of BCR Minerals (Pty) Ltd. Mr. Justin Bowers (Pr.Sci.Nat. - 400067/10) has been appointed to fulfil the role of mentor and supervisor to the process and has reviewed and approved all associated documentation.

A detailed portfolio of the team members associated to the management of this project can be found as **Appendix A**.

#### (1) The qualifications of the EAP

*(with evidence)*

Mrs. Anandi Alers recently completed a Master of Science degree in Environmental Management and Geography in 2015 at the North West University (Potchefstroom) under the guidance of Prof. Luke Sandham.

She holds a Bachelors of Science Honours degree in environmental sciences, specialising in Environmental Management and Geography, and a Bachelors of Science degree in Tourism, Zoology, and Geography.





## (2) Summary of the EAP's past experience.

*(In carrying out the Environmental Impact Assessment Procedure)*

Mrs Anandi Alers has extensive knowledge of the South African EIA process and has recently completed her Master of Science degree in Environmental Management on the subject of EIA follow-up. Her practical experience includes, but is not limited to the following:

- Environmental Management of a number of construction related projects;
- Environmental auditing of a number of projects against the approved EMP's and EA (Environmental Authorisations);
- The development and management of an ISO 14001 EMS (Environmental Management Systems) on a number of construction related projects;
- Develop and implement policies and procedures managing environmental impacts; and
- Managing applications for a number of permits and licences.

A detailed description of all past experiences is available in **Appendix A**.

### b) Description of the property

<b>Farm Name:</b>	Portions 8 and 22 of the farm Kennedy's Vale 361 KT and Portion 24,25,26 and 28 of the farm Spitskop 333 KT
<b>Application area (Ha) :</b>	±2 181
<b>Magisterial district:</b>	Greater Tubatse District Municipality
<b>Distance and direction from nearest town:</b>	±15 km South West from Steelpoort, Limpopo
<b>21 digit Surveyor General Code for each farm portion:</b>	T0KT0000000033300024, T0KT0000000033300025, T0KT0000000033300026, T0KT0000000033300028, T0KT0000000036100025, T0KT0000000036100022.

### c) Locality map

*(show nearest town, scale not smaller than 1:250000)*

Find **Appendix B** indicating the locality of the proposed activity.

### d) Description of the scope of the proposed overall activity

*(Provide a plan drawn to 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.)*

The detailed site layout plan indicating the location, the area (hectares) of all the main listed activities, and infrastructure to be placed on the associated properties can be found in **Appendix C.1**.



All existing infrastructure currently on site are assumed to form part of the prospecting rights and associated bulk sampling activities held by BCR Minerals (Pty) Ltd.

BCR Minerals (Pty) Ltd appointed Dynamic Designs & Project consultants to engineer a detailed storm water management plan. These designs include the following infrastructures:

- Dirty and Clean storm water diversion channels;
- Design of two sedimentation ponds (pollution containment ponds) each equipped with a oil separator; and
- A total of 10 river crossings.

Find **Appendix D** for the detailed designs and **Appendix C.3** for the overall site layout of the associated storm water infrastructure.

The section to follow will provide a detailed scope on the proposed activity.

#### i) Listed and specified activities

A number of listed activities in terms of GNR 983 (Listing notice 1), GNR 984 (Listing notice 2), and GNR 985 (Listing notice 3) have been applied for during the initial Mining right application process (attached as **Appendix E** find the EA granted). Table 1 refers to the listed waste management activities applicable as part of this application.

*Table 1: Listed and specified activities associated to the proposed mining operation*

NAME OF ACTIVITY (All activities including activities not listed) (E.g. 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...etc...etc.)	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY Mark with an <b>X</b> where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)/NOT LISTED
Residue stockpiles	45ha	<b>x</b>	GNR. 633 – Cat B Activity 11
Sedimentation Ponds (SP's)	<b>S1:</b> L – 42m; W – 13m; D – 2m; Total volume –	<b>x</b>	GNR. 921 – Cat A Activity 1



	1428 m <sup>3</sup> . <b>S2:</b> L – 40m; W – 10m; D – 2m; Total volume – 1120m <sup>3</sup> .		
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**ii) Description of the activities to be undertaken**

*(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)*

BCR Minerals (PTY) LTD currently operates a prospecting and bulk sample operation, hereafter referred to as the Spitsvale Mine (SPV) and it is situated in the Greater Tubatse Municipality, South West of Steelpoort town, in the Limpopo Province.

BCR Minerals (PTY) LTD is the registered holder of the rights to chrome and associated minerals on portions 24, 25 26 and 28 of the farm Spitskop 333 KT and portions 8 and 22 of the farm Kennedy's Vale 361 KT, as apparent in the registered prospecting rights with DMR reference number LP30/5/1/1/2/10624PR (Kennedy's Vale) and LP30/5/1/1/2/10603PR (Spitskop). However, BCR Minerals (PTY) LTD is not the registered owner of the surface rights of the abovementioned portions although they are in the process of acquiring a portion of portion 22 of the farm Kennedy's Vale 361 KT. The surface rights on Kennedy's Vale 361 KT are registered in the name of Rhodium Reefs, which is a subsidiary of Eastern Platinum Limited and the relevant portions of the farm Spitskop 333 KT are registered in the name of the Dithamaga Trust. Glencore is the registered owner of Portion 8 of Kennedy's Vale.

An Environmental Authorisation (EA) was granted on the 24 October 2016 for the following listed activity:

Activity 17 of GN.R. 984: *“Any activity which requires a mining right as contemplated in section 22 of the Mineral Resources and Petroleum Development Act (MPRDA), 2002 (Act no. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the MPRDA.”*

The applicable waste management activity (Category A activity 1 and Category B listed activity 11 of GN.R. 633) relates to residue stockpiles associated with the mining of the mineral chromitite and associated minerals, covering an extend of not more than 355 ha, on the properties mentioned and in particular the MG0, MG1, MG2 Package, MG3 and MG4 Package chromitite seams (Table 2). It also include the construction of two sedimentation ponds (Lagoons) to contain the “dirty” storm water runoff.



*Table 2: Resource particular associated with the proposed Spitsvale chrome mining operation*

ITEM	DETAIL
<p><b>Associated Minerals related to the proposed mining operation:</b></p>	<p>Chrome Ore (Cr): Commodity Code B (also referred to as Chromite) is the mineral that will be mined.</p> <p>PGM's (Platinum Group Metals) associated in the Middle and Upper Group (UMG2, UMG1, MG4, MG3, MG2, MG1, and MG0) seams are also found in the area applied for.</p> <p>Other related Minerals can be found:</p> <p>Platinum (Pt), Palladium (Pd), Rhodium (Ru), Ruthenium (Re), Osmium (Os), Iridium (Ir) and base metals Copper (Cu), Nickel(Ni) and Gold(Au).</p>
<p><b>Depth of the mineral below surface:</b></p>	<p>From sub outcrop (2m below surface) to in excess of 300m depth below surface.</p>
<p><b>Geological formation:</b></p>	<p>Chrome Ore situated in the Middle Group (MG) and Upper Middle Group (UMG) being UMG2, UMG1, and MG4, MG3, MG2, MG1 and MG0 chromite seams which occur in the Upper and Lower Critical zones of the Bushveld Complex.</p> <p>The MG chromitite seams are of particular economic significance.</p> <p>The MG1 chromitite seam is separated from the MG2 chromitite layer above by a pyroxenite unit which is 4-8 m thick. The MG2 and MG3 seams are separated by the anorthosite marker which is the contact between the Upper and Lower Critical Zone.</p> <p>These seams are situated approximately 380 metres below the UG2 platinum bearing seam.</p> <p>The current mineral right excludes Chromite seams associated with the UG2 and Merensky reefs</p>



Figure 1: Typical MG1, MG2, MG3 and MG4 Package located on the south-eastern limb of the Bushveld Complex



Figure 2: View of Spitskop and Kennedy's Vale in an easterly direction, MG1, MG2, MG3 and MG4 Package are indicating sub-outcrop position as well as dip direction

As part of the authorised prospecting and bulk sampling phase, some infrastructure has already been constructed. The existing infrastructure consists of the following:

- Three stockpile areas;
- A lay down area that includes offices, a workshop, a hazardous substances storage facility, and ablution facilities; and



- Access roads.

The associated activities of the proposed opencast Chrome ore mining operation will entail the following:

### **Construction Phase**

- Establishment of additional associated infrastructure such as access roads, offices, workshops etc;
- Site clearing (topsoil stripping) for additional lay down areas;
- Construction of Sedimentation Ponds (pollution containment ponds) equipped with oil separators;
- Construction of storm water management features including dirty and clean storm water diversion channels;
- Construction of river crossings;
- Establishment of ablutions & change house facilities with sewage treatment plant; and
- Construction of water storage facilities.

### **Operational Phase**

- Excavation and ground works following a simple roll over method i.e. stripping of topsoil followed by subsoil and preparation of extracting the MG 4 to 1 Package chromite seams;
- Drilling and blasting using a single benching method;
- Stockpiling of residue material;
- Continuous backfilling of residue material in void's created by mining operation;
- Continuous rehabilitation of backfilled areas;
- Processing of ore through screening;
- Stockpiling of ore; and
- Bulk road transport of processed ore.

### **Decommissioning Phase**

- Demolition / removal of portable and related infrastructure;
- Rehabilitation of the lay down areas;
- Demolition of Sedimentation Ponds; and
- Demolition of workshops, waste storage facilities, and fuel storage facilities.

The section to follow will describe the method of mining in more detail.



## **Basic Overview of mining method**

### **(a) Blasting design**

As part of the basic operation proposal, the proposed mining operation will include a blasting design (Figure 1). The blast design is separate from the mine design due to the cost effectiveness of blasting larger benches over a less frequent period.

The proposed blasting design will entail the following:

#### **MG4 Bench:**

The blast design will consist of blasting three benches typically the first bench will be drilled to a depth of 10m and blasted, once this bench is mined out after several cuts to the 10m depth the second bench will be drilled and blasted a further 10m deeper. This bench will then be mined out after several cuts to the final bench for the MG4. A safety bench of 3m will be left to protect the MG3 bench below.

#### **MG3 Bench:**

Once the MG4 is mined out after several cuts to the 10m depth the second bench will be drilled and blasted a further 18m deeper. This bench will then be mined out after several cuts to the final bench for the MG3. A safety bench of 5m will be left to protect the MG2 bench below

#### **MG2 Bench:**

Once the MG3 bench is mined out after several cuts to the 10m depth the second bench will be drilled and blasted another further 18m deeper. As with the previous two benches this bench will be mined out after several cuts to the final bench for the MG2. A safety bench of 5m will be left to protect the MG1 bench below.

#### **MG1 Bench:**

The blast design will consist of blasting three benches typically the first bench will be drilled to a depth of 12-14m and blasted, once this bench is mined out after several cuts to the 12-14m depth the second bench will be drilled and blasted a further 16-18m deeper, this bench will be mined out after several cuts to the final bench for the MG1. This bench will be mined lastly after which the opencast will be rehabilitated. A safety bench of 5m has been left to protect the MG1 bench below, based on the high wall slope stability.

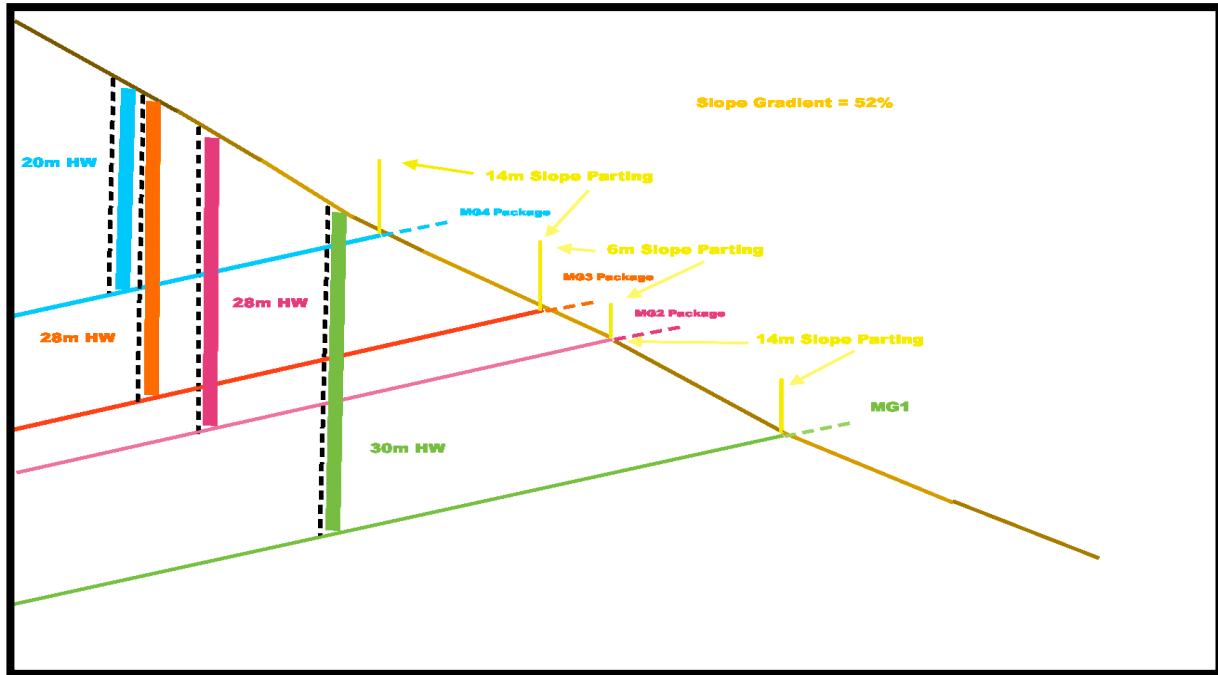


Figure 3: Image showing the mining bench heights from the MG4 to the MG1 bench

**(b) Opencast Mine Design:**

It has been assumed mining will be done by means of drilling and blasting using the single benching method as defined in the blast design.

The mining bench will be planned at 3- 5m intervals with a catchment berm at 6m intervals making the effective bench stack height 4m.

The first 20m bench will be mined or excavated in five 4m half benches or interim benches, this will depend on the equipment used. The 20m benches will have a pushback of 3m behind the 2<sup>nd</sup> blasting bench.

There after the second bench of 8m will be mined or excavated in two 4m benches.

The third bench will be 3m and will be mined or excavated in one 3m bench.

The final bench will be 12m and will be mined or excavated in three 4m benches. This would conclude the final footprint and mineable depth of the opencast.

There are two methods that allow for pit highwall protection against blast induced fracturing or damage:

- The first method is pre-split blast holes closely spaced for the first drill line, close to the final highwall.
- The second method is the planning of shorter blast holes (and thus shorter drilling benches 12m vs. 24m) slightly angled away from the highwall (90 Degrees drilling angle).





The 10m blast-hole depth will reduce the explosive gas expansion and ground vibration that influences crack initiation and migration on the final high wall of the pits.

The design criteria can be summarized as follows:

*Table 3: Design Parameters*

Design Parameter	Parameter Value	Description
<b>Pit Slopes</b>	(From Surface to 80m below = 83 degrees)	Conservative slope assumption
<b>Ramp Design</b>	Inclination of 10% with a ramp width of 15m allowing for two trucks being able to pass at any one time. (1.5 m safety berm on the pit side and 2m toe clearance on the wall side with 9.5m road available.	Standard pit ramp design criteria for trucks up to 50 tonne capacity (Bell B30's, Caterpillar 773's)
<b>Mining Bench Heights</b>	4m total bench height. Not the same as the blasting bench height. Refer to Figure above.	
<b>Residue Stockpiling and deposits</b>	Residue material (overburden/waste rock) will be moved to the stockpile area just on the final pit perimeter, where it will be backfilled directly into the pit as part of the roll over rehabilitation process (Concurrent backfilling whilst mining).	Concurrent backfill mining proved in South Africa and Africa significantly reducing truck cycle time and equipment fleet requirements.
<b>Batter angle</b>	80m pit depth (Batter at 83 degrees),	Standard

### Open Pit Mining

Open pit mining is proposed to mine the shallow ore on the Spitsvale Mine, so as to make ore available as early as possible. A conventional truck and shovel operation is planned. The opencast is proposed to be contiguous and unsterilized along strike, with the chrome ore sub-outcropping at surface.

Factors taken into account in the proposed mine design strategy are as follows:

- Formal and informal settlements in relation to the planned open pit mining area as well as existing mining activities – a mining restriction zone of mainly 600m was used for design purposes, this correlates to the 600m blast radius;
- Residue material to be placed away from chrome sub-outcrop positions, on the high wall side of the maximum high wall position;



- Monthly production of approximately 30,000tpm of RoM ore;
- The weathering profile of the near-surface material;
- Backfilling of mined out areas as soon as possible to minimize dust and aid in rehabilitation, minimize haulage costs and double handling;
- Operating costs – for mining, for processing and for administration;
- Selling costs - for the MG4, MG3, MG2, MG1 and MG0 subject to favourable chrome market prices and operating costs;
- Process recoveries - 80% for MG2, MG1, MG0, 65% for MG4 and MG3;
- Mining dilution of 5% and recovery factor of 70% applies after the in-situ resource estimates; and
- Due to surface weathering an overall slope angle of 7° from vertical are proposed to ensure pit stability. The angle could be further steepened in the deeper solid zones, however a safety factor of 7° is preferred with a bench at 20m.

The proposed operation of the mining activities will be done in a phased approach. The section to follow explains this approach in more detail.

#### **(c) A phased approach**

There are mainly three areas that are proposed to be mined as part of the Spitsvale Mine. These areas will be referred to as follows: (1) Klarinet “Koppie” situated South East on portion 22 and 8 of Kennedy’s Vale and South West on portion 25, 26, and 28 of Spitskop; (2) Tubatse “Koppie” situated North East on portion 28 of Spitskop; and (3) Flats area situated North West on portion 25 of Spitskop and throughout portion 24 of Spitskop.

The mining operations are proposed to start mining at the Klarinet “Koppie” and progressively move to the Tubatse “Koppie” and then lastly the Flats area.

#### **(d) Ore processing**

There will be no beneficiation plant for this application. The process will consist of crushing and screening to produce the various saleable products.

Residue material, if any, will be deposited on waste rock dumps and later backfilled into the opencast void. Shown below is a schematic flow sheet and description of the major items in the proposed Spitsvale Mine plant.

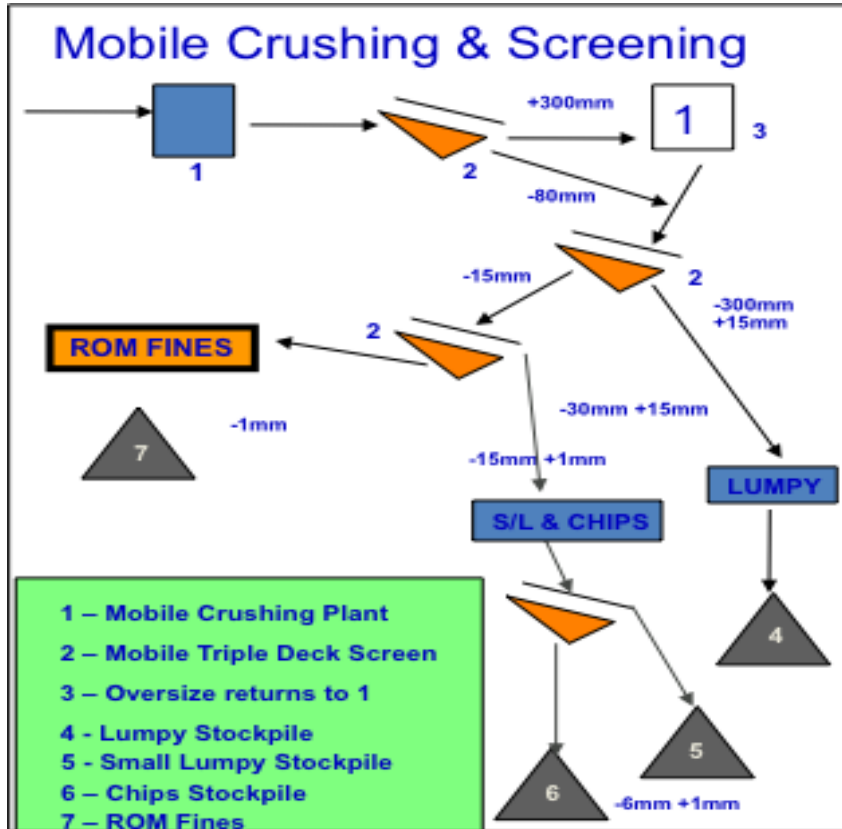


Figure 4: A schematic flow sheet and description of the major items in the proposed Spitsvale Mine process

The major items of equipment that will be used in the mobile plant are the following:

- A mobile / moveable crushing unit will crush the oversized ROM ore that exceeds +300mm after it has passed over the screen;
- Front loaders and dump trucks will be used to transport the ROM ore and products in the following three main areas;
- ROM ore from opencast to the ROM screening area (Stockpile Area), between the different sizing / screening steps, and final products to the various product stockpiles based on size and quality;
- Front loaders will be used to feed ROM material onto the mobile screen; and
- Mobile Screens will be used to separate the ROM material into different sizes as final product.

A limited amount to no residue material is expected to be generated from the ROM that is screened because the mining recovery is expected to be between 85 – 95 % with minimal dilution and no gravity / spiral separation is required.. This method has been tested and proven successful in a similar type of opencast design neighbouring the application area. Thus at this point of the application no processing plant and facilities, i.e. a tailings dam, are required.



*Table 4: Forecast efficiency of the proposed process*

<b>Product</b>	<b>Typical size(mm)</b>	<b>Production per Annum (tonnes)</b>
Lump	60mm – 300mm	90 000
Small Lump	10mm – 60mm	90 000
Fines	<10mm	180 000



**e) Policy and Legislative Context**

*This section will provide the detailed description of the policy and legislative context associated to the proposed Spitsvale Mine (Table 5).*

*Table 5: Detailed Policy and legislative context of the proposed Spitsvale Mine*

<p><b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b></p> <p>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);</p>	<p><b>REFERENCE WHERE APPLIED</b></p>
<p><b>National Legislation and regulations</b></p>	
<p><b>Section 24 of the Constitution of South Africa Act no. 108 of 1996</b></p>	<p>Compliance with all legislation and regulations that prevents pollution and ecological degradation, promotes conservation, and secures an ecological sustainable development and use of natural resources while promoting justifiable economic and social development.</p>
<p><b>The Minerals and Petroleum Resources Development Act, 2002 Act No. 28 of 2002 (MPRDA)</b></p>	<ul style="list-style-type: none"> <li>• Submission of a mining works programme</li> <li>• Submission of an application to a mining right</li> <li>• Application for Environmental Authorisation</li> </ul> <p>A Rehabilitation, closure, and liability plan have been developed as part of the initial mining right application process and are attached as <b>Appendix U</b></p>
<p><b>National Environmental Management Act 107 of 1998 (NEMA)</b></p>	<ul style="list-style-type: none"> <li>• Development of an EMPr for the proposed activities.</li> <li>• Application for authorisation resulting in the submission of this document.</li> <li>• Including emergency response procedures within the submitted EMPr.</li> <li>• Ensuring compliance with a monitoring and audit schedule and plan.</li> </ul>
<p>The following regulations in terms of NEMA are applicable:</p>	



<p><b>GN R. 982:</b> National Environmental Management Act (107 of 1998): Environmental Impact Assessment Regulations, 2014  (2014 EIA regulations)</p>	<p>Independent EAP appointed to ensure Compliance with the EIA procedure.</p>
<p><b>GN R. 983 – 985:</b> Listing notices 1 to 3</p>	<p>A Scoping and EIA process completed and final document submitted to the Department of Mineral Resources. No decision has been received by the time of submitting this report.</p>
<p><b>GN R. 1147:</b> Regulations pertaining to the financial provision for prospecting, exploration, mining or production</p>	<p>Application for authorisation of listed activities in terms of listing notice 1-3 submitted together with the submission of the EIR, EMPr, and Rehabilitation, closure, and liability plan. See <b>Appendix E</b> For the proof of submission.</p>
<p><b>National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA)</b></p>	<p>Requirements as stipulated in the Act will be incorporated with the EIR and EMPr to be submitted for approval.</p> <p>An air quality assessment was conducted during the Scoping and EIA process associated to the mining right application. The recommendations made by the specialist report were incorporated into the EIR and EMPr. These recommendations will form part of the Waste Management Plan (EMPr to be submitted as part of the Waste Management Licence application).</p>
<p>The following regulations in terms of NEMAQA are applicable:</p>	
<p><b>GN 893:</b> List of activities which result in atmospheric emissions</p>	<p>No licence required at this time of the proposed activity.</p>
<p><b>GN R. 827:</b> National dust control regulations</p>	<p>Requirements will be incorporated in the EIR and EMPr.</p>
<p><b>GN R. 283:</b> National atmospheric emissions reporting regulations</p>	<p>Requirements will be incorporated in the EIR and EMPr.</p>
<p><b>GN R. 1210:</b> National ambient air quality standards</p>	<p>Requirements will be incorporated in the EIR and EMPr.</p>
<p><b>GN R. 351:</b> Regulations regarding the phasing-out and management</p>	<p>In the event that any PCB containing product will be used on</p>



of ozone-depleting substances	site this regulation will be applicable. Requirements will be incorporated in the EIR and EMPr.
<p><b>Atmospheric Pollution Prevention Act 45 of 1965</b></p> <p><b>GN R. 1651:</b> Regulations concerning the control of noxious or offensive gasses emitted by diesel-driven vehicles</p>	Requirements will be incorporated in the EIR and EMPr.
<p><b>National Environmental Management: Waste Act 59 of 208</b></p> <p><b>(NEMWA)</b></p>	All waste management activities associated to the proposed mining operation must comply with the requirements set out by the Act. These requirements will be incorporated in the EIR and EMPr associated to the WML application.
The following regulations in terms of NEMWA are applicable:	
<p><b>GN R. 634:</b> Waste classification and management regulations</p>	A waste classification has been conducted to determine the classification of the residue stockpiles.
<p><b>GN R. 632:</b> Regulations regarding the planning and management of residue stockpiles and residue deposits from prospecting, mining, exploration or production operation</p>	<p>The findings of the report conducted by an independent consultant will be incorporated in the final EIR and EMPr associated to the WML application.</p> <p>Requirements will be incorporated in the EIR and EMPr.</p>
<p><b>GN R. 921:</b> Activities listed requiring a waste management licence (WML)</p>	Listed activity number 11, as amended by GNR 633, lists: "The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MPRDA (Act 28 of 2002)"
<p><b>GN R. 633:</b> Amendments to the list of waste management activities that have, or are likely to have, a detrimental effect on the environment</p>	This document serves as an application for a WML.
<p><b>GN R. 625:</b> National waste information regulations</p>	As listed activity 11 of GN R. 633 will be triggered by the proposed mining activities, GN R. 625 will apply. Therefore, the Spitsvale Mine must register as a waste generator. These requirements will be included in the EIR and EMPr associated to the WML.
<p><b>GN R. 635:</b> National Norms and Standards for the assessment of</p>	This regulation stipulates the requirements to assess



waste for landfill disposal	generated waste for disposal to specific designed landfills. As a result, the requirements stipulated in these regulations will be considered in the EIR and EMPr.
<b>GN R. 636:</b> National norms and standards for disposal of waste to landfill	This regulation stipulates the general principles associated to the disposal of waste to landfill. As a result the requirements stipulated in these regulations will be considered in the EIR and EMPr.
<b>GN R. 926:</b> National norms and standards for storage of waste	This regulation describes the general requirements for the management and storage of waste. As a result the requirements stipulated in these regulations will be considered in the EIR and EMPr.
<b>Environmental Conservation Act 73 of 1989 (ECA)</b>  <b>GN R. 425:</b> Waste tyre regulations  <b>GN R. 341:</b> Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials	Requirements incorporated will be considered in the EIR and EMPr.
<b>National Water Act 36 of 1998 (NWA)</b>	Application for a Water Use Licence (WUL) is in process. General conditions stipulated in the NWA will be considered in the EIR and EMPr.
The following regulations in terms of NWA are applicable:	
<b>GN 704:</b> Regulations on use of water for mining and related activities aimed at the protection of water resources	An application for a WUL is in process.  The requirements will be incorporated in the EIR and EMPr.
<b>Hazardous Substances Act 15 of 1973</b>	Requirements will be incorporated into the EIR and EMPr.  Requirements to be incorporated into the Spitsvale Health and Safety management plan.





<p><b>Mine Health and Safety Act 29 of 1996</b></p> <p><b>GN R. 1237:</b> Mines and works regulations</p> <p><b>GN R. 911:</b> Mine health and safety regulations</p>	<p>The requirements set out by the listed regulations must be incorporated into the Spitsvale Mine Health and Safety Management plan. Some of the requirements associated to the environmental health will be incorporated into the EIR and EMPr. The following specific sections are applicable in this report and the EMPr:</p> <ul style="list-style-type: none"> <li>• Storage of hazardous substances;</li> <li>• Acquisition of hazardous chemicals.</li> </ul>
<p><b>Fertilizers, farm feeds, agricultural remedies and stock remedies Act 36 of 1947</b></p>	<p>The requirements specifically related to the use of herbicides and pesticides will be incorporated into the EMPr.</p>
<p><b>Conservation of Agricultural Resources Act 43 of 1983 (CARA)</b></p> <p><b>GN R. 1048:</b> Declared Weeds and Invader plants</p>	<p>The requirements will be incorporated into the EIR and EMPr.</p> <p>This act also deals with permitting of land zoned as Agriculture.</p>
<p><b>National Environmental Management: Biodiversity Act, 10 2002 (NEMBA)</b></p>	<p>Requirements will be incorporated into the EIR and EMPr. However, before the commencement of site clearance an application must be lodged for the removal of protected species as identified in the Terrestrial Ecological Assessment that formed part of the mining right application process.</p>
<p><b>National Veldt and Forest Fire Act 101 of 1998</b></p>	<p>Measures to prevent the spreading of fires will be incorporated into the EIR and EMPr.</p>
<p><b>National Forest Act 84 of 1998</b></p>	<p>Requirements will be incorporated into the EIR and EMPr. However, before the commencement of site clearance an application must be lodged for the removal of protected tree species as identified in the Terrestrial ecological assessment that formed part of the mining right application process.</p>
<p><b>National Heritage Resources Act 25 of 2000</b></p>	<p>The EIR &amp; EMPr submitted as part of the mining right application document complies with section 38(8) of the NHRA that stipulates that a Heritage Resources</p>



	<p>Management (HRM) process must be implemented if an evaluation of the impact of the development on heritage resources is required in terms of the NEMA, the integrated environmental management guidelines issued by the Department of Environment Affairs (DEA), the MPRDA, or any other legislation. The consenting authority (in this instance the DMR) must ensure that the evaluation fulfils the requirements of the South African Heritage Resources Agency (SAHRA) and / or the Provincial Heritage Resources Authority of Gauteng (PHRA-G) in terms of section 38(3) of the NHRA. The NID, HSR and HIA reports completed for the project complies with the aforementioned section. Any comments and recommendations of</p> <p>SAHRA and / or PRHAG must be taken into account prior to the granting of the consent.</p>
<p><b>Occupational Health and Safety Act (Act 85 of 1993)</b></p> <p><b>GN R.1248:</b></p>	<p>Requirements to be incorporated in the Mine Health and Safety plan.</p>
<p><b>Government Policies</b></p>	
<p><b>Waste Management policies</b></p>	<p>In terms of waste management in South Africa, there are two main policies that will be considered in the development of the EIR and EMPr. The two main policies considered were regarding the management and disposal of fluorescent tube disposal and the management of sewage sludge. Best practice principles will be incorporated into the EIR and EMPr.</p>
<p><b>National Environmental Health Policy</b></p>	<p>This policy document is intended as a 'broad guideline for the effective implement and rendering of Environmental Health Services in South Africa'. It incorporates the philosophy of Environmental Health includes principles such as primary prevention, transparency, polluter pays, precautionary principle and cradle to grave.</p>
<p><b>SANS Standards</b></p>	
<p><b>Hazardous substances management</b></p>	<p>The following two SANS standards will be incorporated into the EMPr:</p>



	<ul style="list-style-type: none"> <li>• SANS 10089-1:2008 - Specifications for above-ground storage facilities for petroleum products</li> <li>• SANS 310: 2011 - Storage tank facilities for hazardous chemicals: Above-ground storage tank facilities for flammable, combustible and non-flammable chemicals.</li> </ul>
<b>Provincial Legislation</b>	
<b>Limpopo Environmental Management Act No. 7 of 2003</b>	Requirements will be incorporated in the EIR and EMPr. The requirements for permitting of protected plants are stipulated and form part of LEMA.
<b>Limpopo Conservation plan</b>	Requirements will be incorporated in the EIR and EMPr.



#### **f) 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 northern part of South Africa is widely known for the location of the Bushveld Complex, a saucer-shaped deposit containing a large percentage of the world's economically mineable Chromitite ore reserves. This complex is the largest known layered ultramafic/mafic intrusion in the world as it stretches some 480km east-west and 240km north-south over the North West and Limpopo Provinces. Chromitite ore is mined along the eastern and western rims of the complex, which has a surface area of about 66,000 km<sup>2</sup> (Maier *et al*, 2011).

The Chromitite ore and concentrates are used primarily in metallurgical applications such as the production of ferrochrome, which is a major input in the production of stainless steel. Other applications include refractories, foundry sands and chromium chemicals.

Based upon the authorised prospecting activities of the proposed Spitsvale operation approximately 50% of the products from the project are likely to be sold locally and the remaining 50% in the international market. The most likely local customers are the following:

- Samancor Tubatse Ferrochrome
- Glencore Lion Smelter

A large portion of the products is exported internationally through the Durban and Maputo terminals and will be dependent on the international demand. In this regard, despite the current economic crisis in the eurozone and a slowdown in the growth rate of the Chinese economy, the long term outlook for chrome remains good as it is closely linked to stainless steel production, which is expected to experience renewed growth in demand in the medium to long term.

According to the Draft 2015/2016 IDP for the Greater Tubatse Municipality (GTM), the eastern limb of the Bushveld Igneous Complex is emerging as an important structuring element of the municipality's spatial development, and will be increasingly dominant in future. The IDP for GTM also indicates that retail and service businesses will respond to the opening of mines and the development of housing by also locating close to these areas. In time, this may eventually alter the current fragmented spatial pattern by creating few large urban settlements, if the expected scale of mining activities materializes. It is also highlighted by the IDP that the existing resources in the GTM area remains unexploited and that the investment in this sector brings with it important investment in infrastructure development as well as job opportunities and economic spin-off. The lack of economic growth in the region warrants special attention and support to optimize the available opportunities. However, cognizance should be taken of the outflow of money from the mines in Greater Tubatse to other regions.

GTM has developed its Local Economic Development (LED) Strategy in June 2007 and is aligned with the Limpopo Growth and Development Strategy, Provincial Spatial Framework, National Spatial Development Perspectives and



ASGISA (Accelerated and Shared Growth Initiative for South Africa). The strategy identifies the mining activities taking place in the area as the primary economic activity in GTM. It also outlines key issues that have to be taken into to unlock the economic potential in GTM. To date, the growing mining sector in the GTM has resulted in GTM being the 7th largest regional economy in South Africa.

In addition to the local and national economic benefits of the proposed mining operation, there will also be socio-economic benefits. The following positive impacts are anticipated:

- Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the increased spending power of employees;
- Local and regional employment opportunities. Although smaller in number than employment creation during the construction phase, these will have a significantly longer duration;
- Increased business opportunities for local entrepreneurs through the supply of goods and services to the mine;
- A positive macro-economic impact at a local, regional and provincial level due to operational expenditure, taxes and royalties; and
- Economic and social benefits associated with Corporate Social Responsibility (CSR) and Local Economic Development (LED) initiatives by the mine (See **Appendix F** for the final Social and Labour plan).

Unemployment is a major problem within the GTM. The proposed Spitsvale Mine operation will have a positive impact on the baseline social-economic conditions of the local communities involved. The mine will create several employment opportunities and preference will be given to the locally unemployed wherever possible. The mine will contribute towards the socio-economic development of the region as a whole through social upliftment and job creation as primary agents.

However, clear policy guidelines and careful management of Project implementation will be required to ensure that benefits for the local population and economy are maximised. For maximising of the positive outcomes, these policy guidelines must be reviewed on a regular basis throughout the entire life cycle of the Spitsvale operations.

#### **g) Motivation for the preferred development footprint within the approved site**

*(Full description of the process followed to reach the proposed development footprint within the approved site. NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.)*

The proposed Spitsvale Mine is located within the BCR Minerals (Pty) Ltd prospecting and bulk sampling right area (LP30/5/1/1/2/10624PR (Kennedy's Vale) and LP30/5/1/1/2/10603PR (Spitskop)) and the surrounding area is currently used for mining related activities. The Mining Right area can only be located within the Prospecting Right area and the mineralised zone is located within the three areas that are proposed to be mined:



- Klarinet “Koppie” situated South East on portion 22 and 8 of Kennedy’s Vale and South West on portion 25, 26, and 28 of Spitskop;
- Tubatse “Koppie” situated North East on portion 28 of Spitskop; and
- Flats area situated North West on portion 25 of Spitskop and throughout portion 24 of Spitskop.

The positioning of the Overburden (Waste Rock) Stockpiles (**Appendix C.2**) has been selected based on the following considerations:

- Limiting of the footprint by stockpiling the overburden material *in situ*;
- Avoiding multiple handling of material as a more financial feasible option; and
- Overburden being backfilled as part of the roll-over rehabilitation process.

The positioning of the Sedimentation ponds was based on the recommendations made in the Hydrological Assessment (**Appendix G**). The ponds are gravity fed, therefore the current recommended positioning will be implemented (**Appendix C.3**).

#### **i) Details of the development footprint alternatives considered**

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

The submission of this EIR & EMPr report is associated to the management of residue stockpiles and deposits as well as the construction of two sedimentation ponds (Lagoons) associated to the applied mining right (DMR ref: LP 30/5/1/2/3/2/1 (10104)). For reasons described in the sections to follow, no property alternatives were able to be considered as mining operation is only allowable within an authorised property.

The location of the stockpiles, however, considered all identified environmental features and land uses as well as issues raised by the I&APs.

The following sections provide the motivation of the proposed site plan (**Appendix C.1**).

#### **(a) Property on which or location where it is proposed to undertake the activity**

No property alternatives have been considered as the envisaged mining operations will occur on properties already utilised for the prospecting and bulk sampling operations and where BCR Minerals (Pty) Ltd has negotiated surface rights. Furthermore, extensive reconnaissance work informed the prospecting & bulk sampling activities based on the probability of chromitite deposits on these properties.

It may be worth noting the ecological status of the surrounding area that may be more sensitive and less desirable for mining activities. **Appendix H.1** provides a sensitivity map to indicate the ecological status of the proposed properties.



### **(b) Type of activity to be undertaken**

The proposed mining activity relates to the open cast mining of the mineral chromitite and associated minerals in particular the MG0, MG1, MG2 Package, MG3 and MG4 Package chromitite seams. No alternatives to mining the material listed have been considered.

### **(c) Design or layout of the activity**

The site layout, as attached in **Appendix C.1**, in terms of the positioning of haul roads, lay down areas, RoM product stockpile areas, workshops, topsoil and subsoil stockpiles, screening plant, and residue stockpiles was determined by considering both spatial and practical mining operation aspects.

The lay down areas and associated infrastructure constructed for the prospecting and bulk sample phase of the Spitsvale Mine will be utilised as part of the proposed mining activity.

The following factors are considered in planning the lay down area:

- Visual distance from local community i.e. Dithamaga Trust;
- Haul distance; and
- Sensitive environmental and social areas.

The positioning of the Overburden (Waste Rock) Stockpiles (**Appendix C.2**) have been selected based on the following considerations:

- Limiting of the footprint by stockpiling the overburden material *in-situ*;
- Avoiding multiple handling of material as a more financial feasible option; and
- Overburden being backfilled as part of the roll-over rehabilitation process.

The positioning of the Sedimentation ponds was based on the recommendations made in the Hydrological Assessment (**Appendix G**). The ponds are gravity fed, therefore the current recommended positioning will be implemented (**Appendix C.3**).

BCR Minerals (Pty) Ltd appointed Dynamic Designs & Project consultants to engineer a detailed storm water management plan. These designs include the following infrastructure:

- Dirty and Clean storm water diversion channels;
- Design of two sedimentation ponds (pollution containment ponds) each equipped with a oil separator; and
- A total of 11 river crossings.

Find **Appendix D** for the detailed designs.



#### **(d) Technology to be used in the activity**

No alternative in terms of the technology to be used was considered.

#### **(e) Operational aspects of the activity**

The proposed activity relates to the open cast mining of Chrome Ore. The operational aspect entails topsoil and subsoil stripping and stockpiling, drilling and blasting, excavations, RoM product hauling and stockpiling, screening, and bulk transport of end product.

The processing of end product may be considered further down in the life cycle of the mine. However at the present time no processing will occur.

Depending on the financial feasibility, underground mining may be considered as a mining alternative.

#### **(f) The option of not implementing the activity**

The “no-go” option for implementing the activity has been considered, but due to the fact that operations are about to commence for the bulk sample and that the mining of the resources will lead to job creation, the contribution to the GDP of not only the municipality (the importance of mining development as indicated in the GTM IDP 2015/2016), but also the Province as a whole, it is advisable that the mining activities be authorised with strict adherence to findings and recommendations in this report and its appendices.

#### **ii) Details of the Public Participation Process (PPP) 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.)*

Environmental Management Assistance (Pty) Ltd (EMA) has appointed Ecoleges as an independent consultant to manage the public participation process.

#### ***Determining the level of public participation***

The level of public participation was determined by taking into account the scale of the anticipated impacts of the proposed project, the sensitivity of the affected environment, the degree of controversy, and the characteristics of the potentially affected parties. Based on the findings of the aforementioned consideration, it was deemed not necessary to elaborate on the minimum requirements of the public participation process as described in the EIA Regulations, 2014.

The detailed determination of the level of public participation is described in **Appendix I**.





No reasonable alternative methods, in those instances where a person is desiring of but unable to participate in the process due to illiteracy, disability or any other disadvantage, were required.

### ***Notification of potentially interested & affected parties***

The PPP commenced on the 12<sup>th</sup> of August 2016. Potentially interested and affected parties were notified of the proposed application by –

Fixing two (2) notice boards 60cm by 42cm at places conspicuous to and accessible by the public on 12<sup>th</sup> of August 2016, specifically at:

1. S 24.8425895 & E 30.1220816
2. S 24.8328232 & E 30.1237309

Written notice to owners and occupiers of land adjacent to Portions 24, 25, 26, and 28 on farm Spitskop 333 KT and Portions 8 and 22 on farm Kennedy's Vale 361 KT and any organ of state having jurisdiction in respect of the proposed activity were provided.

A Background Information Document (BID), that included the waste management activities, was prepared and distributed via email, fax or post to all possible I&AP on 12<sup>th</sup> of August 2016.

An advertisement in a local newspaper, the Steelburger News, was placed on the 12<sup>th</sup> August 2016.

Before the submission of this document, the Draft Scoping report was distributed for a 30-day comment period. The commencement date of this comment period was the 17<sup>th</sup> of August 2016 ending on the 15<sup>th</sup> of September 2016.

A notification email was sent to all registered I&AP providing information on how to access the Draft report. The draft report was uploaded on the Environmental Management Assistance (Pty) Ltd company website by following the following link: <http://www.emassistance.co.za/index.php/public-documents/category/3-bcr-minerals-pty-ltd-waste-management-licence>.

Hard copies were made available at the following locations:

- Post Office in Steelport,
- Dithamaga Community Office
- Greater Tubatse Municipality Library &
- Eerste Geluk Library.

All comments received were included in the comments and response register (find **Appendix I**) and considered in the finalisation of this report.



Public participation during the impact assessment phase of the EIA revolves around a review of the findings of the EIA, presented in the draft EIR and EMPr including specialist studies. This report will be made available to potential and registered I&APs for a 30-day comment period, including:

- State department(s) that administer a law relating to a matter affecting the environment,
- The Competent Authority (CA), and then
- Potential and registered I&APs.

Potential and registered I&APs will be advised of the availability of the draft EIR and EMPr and of how to obtain it.

The Specialist Feedback meeting, that included the discussion of waste management activities, was held at Tubatse Country Club on the 28<sup>th</sup> of January 2016. The purpose of the meeting was to discuss the findings of the specialist assessments that were undertaken and any other comments, queries and/or concerns regarding the draft EIR. The date was determined by the availability of the relevant specialist reports and to provide potential and registered I&APs sufficient time to review the reports and raise their concerns at the meeting, as well as give the EAP reasonable time to respond to and incorporate the comments from the said meetings into the final EIA Report.

Comments were recorded. All the issues, comments and suggestions raised during the comment period on the draft EIR and EMPr that formed part of the mining right application process were added to the Comments and Response Sheet.

Once the competent authority has made a decision whether to grant or refuse authorisation in respect of all or part of the activity applied for, the EAP will, within 14 days of the date of the decision to the application, notify Registered I&APs of the decision, including how to access the decision, reasons for such a decision and draw their attention to the fact that an appeal may be lodged. Preferred distribution of the written notification shall be via email, facsimile and post, if necessary.

**Appendix I** provides the report describing the process followed in terms of the PPP, as well as proof of the PPP.



### iii) Summary of issues raised by I&APs

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

Table 6: Summary of comments and issues raised by the I&AP

Interested and Affected Parties	Date	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.	
<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>Comments Received</p>				
<b>AFFECTED PARTIES</b>					
<b>Landowner/s</b>					
<b>Dawie Barnard</b>	x	<b>Email on 10/12/15</b>	Rhodium Reefs Ltd would like to register as interested and affected party. Please keep us informed of all meetings in this regard.	Noted. Thank you Mr Barnard	Addressed in the EIR and EMPr submitted for the mining right application process.
<b>Kennedy Owuor (Representative of Glencore)</b>	x	<b>At the meeting held on 28/01/16</b>	Where is Lion Smelter on the map?	Shown on the map.	Addressed in the EIR and EMPr submitted for the mining right application process.
			Will later want to know the exact proximity.		
			Will copies of the specialist studies be provided?	PDF format copies will be provided and will be in the final report as well. A dropbox link will also be created.	



			<p>Follow-up on the soil types &amp; management plan that will be coming out of it. Look at how soil erosion &amp; flooding is to be dealt with as it was indicated that the area has thin soil. Especially during stripping. When stripping all sorts of alien species come up very fast, management thereof.</p> <p>During the Land use, which is connected to water. Portion 8 – Part of Glencore Surface Rights. Will we be consulted more in terms of monitoring of boreholes &amp; notified to make recommendation.</p> <p>Within this area. Especially Portion 8 on the Spitskop side, that is where the Lion Smelter extracts its water from, especially the water used for the plant. If the borehole is going to be set there, we need to know if it's going to be a monitoring borehole. We will be affected in terms of our current water use license from the Department.</p> <p>Existing roads – The Tweefontein road from R555 towards the entry. We have a concern there; traffic management will need to be looked into, in terms of the trucks and the speed. Temporary lanes are recommended to accommodate the public.</p>	<p>Erosion &amp; flood events are dealt with in the hydrological assessment report as well as Stormwater measures and flood measures.</p> <p>Will look into the traffic report to see if it was considered.</p> <p>EAP mentioned that recommendations were included in the traffic assessment report.</p>	
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			<p>Need to understand how much water will be needed, be it for processes/consumption. The borehole water will not be enough. Borehole water is not advisable. Consider surface water, the closest is the Dwars River, approach the DWS. Look at Lebalelo Pipeline, its expensive yes, but might be better. Look at alternatives, De Hoop would be a best bet.</p> <p>Is it possible to get an estimate of how much water will be used.</p>	<p>Noted. Water balance will provide detail on total water usage requirements.</p>	<p>All concerns and comments will be addressed in the IWWMP as part of the WULA process.</p>
		<p>Dust Monitoring: Are those the places (positions indicated on the slide) where the dust buckets will be placed?</p>	<p>Client will be advised to use more locations for dust-bucket placing.</p> <p>Consult Lion Smelter when locating the dust-buckets. Wouldn't want cross-liabilities.</p>		
		<p>Where are the boreholes on those properties?</p> <p>Please provide that information to Lion Smelter as well.</p>	<p>Showed on the map.</p> <p>Noted. Will do.</p>		
		<p>Are you saying there will be no dewatering?</p>	<p>No, around the Spitsvale Flat areas koppie areas, there will be. On this particular seam, the pit is going to be below that of the groundwater resource.</p>		
		<p>Asked that ground water levels of water be checked next to the Lion Smelter on Portion 8 &amp; 9.</p>	<p>Will do.</p>		



			Why include S21(g) if you will not do tailings?	<p>In terms of waste management there will be no tailings associated with processed material, only residue stockpiles i.e. Inert material). Overburden is considered as waste in terms of the Waste Act.</p> <p>Section 21 (g) are also applicable to the Sedimentation Ponds (Sedimentation Ponds). GN 704 requires that “dirty” and “clean” water be separated, “Dirty” or any effluent resulting from the proposed mining activities will be contained in these Sedimentation Ponds , therefore section 21 (g) applies.</p>	
<b>Lawful occupier/s of the land</b>					
<b>Shadrack Masha (Resides in Dithamaga Village)</b>	x	<b>By hand on the registration sheet at the meeting on 28/01/16</b>	<p>Take note that Dithamaga Village is a community closer to the Spitsvale Mining- BCR Minerals Ltd. The said community deserves to have or given first priority in business operation with regard to SMMME development simply because the negative impact (Air pollution, noise pollution, ground shaking during blasting, etc) in mining operations do affect them i.e Dithamaga is an affected party.</p> <p>Moreover, Dithamaga Community and/or business people must be given priority to comply in terms of the mining</p>	Noted. Thank you!	<p>Addressed in the EIR and EMP submitted for the mining right application process.</p> <p>Concerns raised regarding water uses will be addressed in the IWWMP as part of the WULA process.</p>



			<p>charter.</p> <p>BCR Minerals or Spitsvale Mining must ensure that first priority is given to Dithamaga SMME in terms of procurement.</p> <p>Spitsvale Mine needs to develop mechanisms for SMME financial empowerment for instance, financial incubation programmes must be in place. BCR must take a lead.</p> <p>Dithamaga being poor of the poorest in deep rural areas SMMEs must get letters of intent so as to simply acquire financial support or empowerment from financial aid agencies like e.g. Anglo Zimele.</p> <p>Personally, individuals need to be given first priority in terms of broad based long term skills development programmes like for instance, learnerships, internships and bursaries.</p> <p>Spitsvale Mine must develop a career plan and mentorship plan which also, must be included in their draft SLP.</p> <p>In conclusion Dithamaga Land owners must come up with well-informed business models in order to give support to private company or developers to pro-actively unpack the LED projects.</p> <p>For instance, tourism &amp; farming are also major economic</p>		
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			Develop empowerment for broader bonafide citizens of South Africa, the country, continent & internationally.		
			Will copies of the presentation be made available?	Yes, transparency is the main aim and objective of the Public Participation Process.	
			Elaborate on the water supply (potable & process).	Forms part of the Water Use License process to look at and assess all the impacts concurrently.	
			On air quality- Can you comment on the air pollution.	Will go into detail later when the slide on the findings of the study conducted on air quality comes up.	
			Clarity on the impacts of blasting on the residential area. How close is the blasting area?	Slides on the radius of the blasting area are coming. There are many ways of blasting. Close to humans controlled blasting will be practiced.  DS confirmed this.	
			On some of the slides "mining on Tubatse" comes up; Tubatse what?	The specialists don't always have insight into the accurate landmarks names.  There are three (3) mining areas on the property. Tubatse is a name for one of the areas that will be mined. We will get into that slide later.	





		<p>Another distribution centre for the report needs to be the Greater Tubatse Municipality Library.</p> <p>Will the EMPr also be ready by the end of February?</p>	<p>The Final Report, including all specialist reports, will be done only at the end of February.</p> <p>Yes, the EMPr will be ready, but the DMR has been informed of the time extension.</p>
		<p>The Mabelane Homestead is just a section that falls under the Dithamaga Village.</p> <p>The affected communities are on Phase 2. Both Tubatse &amp; Dithamaga are affected, not only Tubatse.</p>	<p>It's the area of the village that is closer to the mine.</p> <p>Noted.</p>
		<p>Water source from boreholes – 70% of the water will be used for the mining industry. Check with relevant source when the distribution process will begin with De Hoop Dam.</p> <p>Cost should not be an issue because it's the municipality's responsibility to make sure that the distribution is budgeted for.</p>	<p>Reason for alternative sources is because the Olifants Water Resources Development Project (ORWRDP) pipeline is far from being finished, and hence alternatives had to be considered. The distribution &amp; associated costs from the ORWRDP are also uncertain.</p> <p>The mining activity will not involve processing, so the only use for water will be for ablutions and consumption. The water will also be used for dust suppression, however the specialist have indicated on the static water balance that there will be an excess of Average wet season is 22 527m<sup>3</sup>/month and</p>



				average dry season is 8 065m <sup>3</sup> /month.	
			Clarity on the mentioned places for the PM10 & PM 2.5 dust fall outs.	Just shows that the fallout is way below the thresholds (within the limit).	
			Please include Dithamaga & Tubatse on the baselines and reports.	Noted.	
			Concerned about the Koppies (Klarinet & Tubatse) that are being referred to. Why not Dithamaga Mountains? Namely; Madikoto, Marutseng, Tshehleng.	This model shows water at different levels over mining areas.	
			How often is the water level tested when the mine becomes operational? Legislatively what should it be?	Quarterly. Will confirm if its quality or quantity. Will be specified once the license has been issued.	
			Where are the tailings to be put?	At this point there will not be any tailings, as no processing will be done. JB added that the idea is to look at the project holistically. That is why some activities might not apply in initial phases but are likely to come on line at later stages..	
			The landowner must speed up it's business model in terms of economic Development and tourism. Long term skills Development needs to be considered – Provide people with skills & opportunities to create their own jobs. Financial letter of intent to support the local SME's.	Needs to come into the Social Plan as part of the mining works program. There are other tools to capture what you have just named.	



			Ownership participation to be considered. Procurement systems.		
<b>Thomas Mpholwane</b> <b>(Resides in Dithamaga Village)</b>	x	<b>At the meeting held on 28/01/16</b>	Portion 28 (Tubatse Residence) - close to the area of operation also on the side of the R555. Is there any specific level of decibels that will be considered, the recommended is 85? Especially with regards to blasting.	It was suggested that it be seen if the noise presentation covers that (to follow later in PowerPoint presentation) and if not, will be requested from the specialist.	Addressed in the EIR and EMPr submitted for the mining right application process.
			Please check on the chromite diseases that will arise.	Yes, and that it should be on the air quality & human health slides.	
			Suggest that the distribution centre be the Post Office in Steelport, Dithamaga Community Office & Eerste Geluk Library.  Is there any other consultation that will be done similar to this one so as to follow up if the comments were incorporated into the final decision?	Any comments will be put into the comments and response register, will be responded to and will form part of the final reports.	
			It's not Manapane, its Mangabane.	Noted.	
			Once the draft has been finalized, monitoring should be clarified.	Noted.	
			Is a Social Labour Plan analysis in place and made available to everyone? Please translate these reports into Sepedi.	Will look into it.	



			Thank you for the invitation to engage in this process.	Noted.	
			Monitoring programmes must be finalised, so as to see if they are in conjunction with the LED (Limpopo Economic Development) programmes.	We are truly committed to speeding it up as much as we can, but not at the expense of proper process or content of the reports.	
<b>Thomas Mavunda (Representing Eskom- as a Servitude Holder)</b>	x	<b>At the meeting held on 28/01/16</b>	Eskom needs a site layout plan to check and verify the exact location of the project's impacts on their lines.	Will provide plan.	No confirmation received whether future and current Eskom projects will be affected.
			There are building restrictions that must be complied to. Eskom must be consulted for comments on all plans, so as to alert them on planned line routes, including blasting. There is an Eskom standard that must be adhered to.  Can we please have a copy of the presentation?	Shape files will be supplied to both Eskom Distribution & Transmission to make sure that necessary mitigations are included in the EMPr.  All attendees will receive a copy of the presentation.	
			Will Eskom's supply NOT be needed?  Are there any operations currently?	Yes, Eskom's supply will be needed at the operational stage.  There is a preliminary process currently underway known as bulk sampling as part of the prospecting process.	
			Eskom wants it to be known that their lines might be	Noted.	



			<p>extended and/or upgraded in future. It's important for the mine NOT to ignore Eskom as it is their obligation to supply sufficient energy. A drawing showing the exact position is vital to facilitate proper planning.</p>		
			Does the mine own all the portions?	Only one portion is owned by the mined, all the others are leased.	
<b>Vuledzani Thanyani</b> <b>(Representing Eskom- as a</b> <b>Servitude Holder)</b>	x	<b>At the</b> <b>meeting held</b> <b>on 28/01/16</b>	<p>Are the red areas on the map the only areas that will be mined?</p> <p>The shape files we got were not clear enough as to which areas will be mined. We were under the impression that the whole box will be mined. Can we get the shape files just for the areas where activity will take place so that we can overlay the drawings?</p>	<p>Yes.</p> <p>We will supply that.</p>	<p>No confirmation received whether future and current Eskom projects will be affected.</p> <p>Addressed in the EIR and EMPr submitted for the mining right application process.</p>
			<p>Looking at the blasting rings, were existing infrastructure considered and looked at? It looks like there are existing powerlines.</p>	<p>Suspicion is there is a standard blasting protocol that was / will be used. In those sensitive areas, the safest method will be used and considered as mitigations.</p> <p>Blasting areas are carefully considered and taken into account. Given at least a 500m radius. Blasting areas will be shifted accordingly to take into account existing infrastructure.</p>	



			We have an environmental authorization for new lines that will run exactly where the blasting will take place	It was asked that the plans and EA be supplied so that they can be overlaid on the mining plan and necessary adjustments made where feasible.	
			What is the mine's power source? Two proposed substations will be affected by this development.	Currently using <i>Genset</i> , a generator system. Will be interested in an alternative method in future.	
			Does the study cover the whole block? Will the Department authorize the whole block or just the activity area?	The 2014 Regulations no longer allows for the amendment of EA's to include additional listed activities, a new assessment process needs to be undertaken; so that is why we include everything even though it might not be implemented immediately, including the layout plan which is then binding on the client.	
			Don't want to be okay with the whole polygon that might be authorized by the Department with the impression that only a small area will be mined & will not affect their infrastructure. Eskom needs to know exactly where the activity will take place so as to object if need arises because currently a whole lot of their lines will have to run there in the near future.	The properties affected by the mining activities are listed but not the entire area will be utilized only sections within its boundaries.	
			There are powerlines that have been authorized for the	The process of consultation and analysis of	



			future that run across the study area. Plans need to be joined so as to make proper and relevant remarks & comments.	potential areas of conflict can be driven by the current EIA process. Even if you can give us the name of the EAP that consulted for the EA to obtain the necessary shapefiles to create the necessary map overlays.	
<b>Landowners or lawful occupiers on adjacent properties –</b>					
<b>See Appendix I</b>					
<b>Municipal councillor - See Appendix I</b>					
<b>Municipality - See Appendix I</b>					
<b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA etc.)</b>					
<b>Phuti Mabotha (Representing LEDET)</b>	x	<b>At the meeting held on 28/01/16</b>	Explain in detail negative impacts as well as mitigations.	That is impractical and will take forever, however, the report will entail that. The Public Meeting does not cater for in-depth analysis of Aspects, Impacts & Mitigations, that information is contained in the EIR & EMPr available for review.	Addressed in the EIR and EMPr submitted for the mining right application process.
<b>Tshifhiwa Mathase (Representing DWAFF)</b>	x	<b>At the meeting held on 28/01/16</b>	Has the trees & natural forest been covered?  Please consider the protected trees & natural forest. Projects that will impact species such as <i>Catha Transvalensis</i> ( <i>Lydenburgia cassinoides</i> , Sekhukhune busman's tea) and <i>Catha edulis</i> (Bushman's tea) should be avoided. Certain Species are only found here in the	Yes.  A biodiversity study has been undertaken; there is a full species list of species.  Mitigation measures include a pre-construction walk through for purposes of search & rescue (translocation where possible) of protected plants & will be	Addressed in the EIR and EMPr submitted for the mining right application process.



			Sekhukhune District, serious mitigation strategies need to be in place. The Department needs to be part of the site inspection.	included in the EMP. Department (DAFF) to be part of search process.	
	Email on 18/04/16, pending site inspection on 12/04/16.		<i>Lydenburgia Cassinoides</i> (Sekhukhune Bushmen's tea) is confined at Sekhukhune District Municipality only therefore, the Department requires a plan that will ensure continuous existence within the municipality.	Noted.	Addressed in the EIR and EMP submitted for the mining right application process.
			When constructing new roads, divergence of roads is recommended where protected trees will be affected.	Noted.	
			As endorsed in your EMP, relocation of protected trees should be adhered to, particularly all trees that are 1m and below. It should also be done under supervision of specialists to minimize mortality rate.	Noted.	
<b>Communities -</b>					
See Appendix I					
<b>Dept. Land Affairs -</b>					
See Appendix I					
<b>Traditional Leaders -</b>					
See Appendix I					
<b>Dept. Environmental Affairs</b>					
See Appendix I					
<b>Other Competent Authorities affected -</b>					
See Appendix I					





OTHER AFFECTED PARTIES				
See Appendix I				
INTERESTED PARTIES				
Humphrey Mphage	Email on 13/12/15	Please register as interested and affected party in your project. We need PR/M licence no. from DMR for Spitsvale Chrome mine. Can u furnish corporate person report on Spitsvale Chrome mine? Furnish us with draft water use licence, EAI, waste management report, drilling programme report, Acid mine drainage report and PH pollution report, Type of chrome oxide for processing, Social labour plan draft or final, Copies of permits from district, local and national gov. or any documents linking to project. Who is black partner to the projected, Lwala mining BEE partner is Ehlobo Holding, Batho Barena, employees and women in mining. Do your project comply with climate change, mine health and safety principles .Can u furnish footprint of area to be affected by your project. In an opencast mine did u measure distance of affected, how many kilos from mine, is blasting safe 4 villagers/passbyers/land owner. Did u research existing boreholes, rivers to be affected. Can u furnish list of stakeholders to the project. The ff. Are community biz ,eg, Ore transport, diesel supply, waste management, borehole drilling, Park homes supply, fencing, roads construction, chemicals supply to separate ores and what community projects as sustainable could formed, who will fund them. Is BCR MINERALS	Good morning Mphage,  Thank you for registering as an Interested and Affected Party (I&AP). Your questions and requests have been noted, and will be responded to in due time.	Addressed in the EIR and EMPr submitted for the mining right application process.



		,Ecoleges having local BEE partners?		
	<b>Email on 18/12/15</b>	<p>Thanks Hlengile 4 registration. I tried 2 send another additional comments but failed on Justin email. Kindly register ff:-</p> <p>-Can we form conservation \$environmental committee as watch dog to project operations perpetually ?-Can your mine put budget to conservation \$ environmental committee as contained in your SLP continuously as starting of environmental sustainability? How are u going to monitor environmental protection \$ sustainability ?Root causes of environmental crisis ,principles of ecology , biomes and aquatic life zones ,self sustaining mechanism in ecosystems ,Human ecology. Solutions 4 a sustainable society- how are u going to create a sustainable system of agriculture to feed community? How are u going 2 preserve grasslands, forests, wilderness, if any, water resources, the earth and minerals resources. The year 2016 in February mining Indaba is taking in Cape Town, can u sponsor environmental committee for five days ,travelling, accommodation ,registration and attending courses, meals etc. Learning 2 live with earth's carrying capacity ; how will u be creating sustainable villages, graves, customs etc .How will u protect principles of toxicology, Air pollution and noise, water pollution ,Hazardous and solid waste ,Sustainable economics to villagers and land owners,</p>	<p>See Appendix I(2) of the report attached in <b>Appendix I</b></p>	<p>Addressed in the EIR and EMPr submitted for the mining right application process.</p> <p>As part of compliance with GNR 982, all compliance reports will be made available to the public to review and comment.</p>



		Sustainable economic Development ,Law, Government, and Society. Thanks, Humphrey		
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Find attached **Appendix I** for the details of all registered I&AP.



#### **iv) Environmental attributes associated with the development footprint alternatives**

*(The environmental attributes described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)*

The section to follow describes the environmental attributes associated with the development footprint alternatives.

##### **1) Baseline Environment**

In order to determine the baseline environment of the proposed location of the Spitsvale Mine, a number of specialist investigations were initiated as part of the mining right application.

The section to follow summarises these findings and recommendations that formed part of the Mining right application process (EIR and EMPr submitted on the 25 April 2016). Those findings related to the management of residue stockpiles and lagoons (two sedimentation ponds) will be considered as part of the waste management licence application process.

##### **(a) Type of environment affected by the proposed activity**

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

The information in the following sections has been extracted from the submitted specialist reports that were submitted as part of the mining right application (EIR and EMPr submitted on the 25 April 2016).

##### **I. Climate**

Situated in the Greater Sekhukhune District Municipality (Limpopo), the proposed mining operation is located in the summer rainfall zone of the Republic of South Africa. As a whole the region is considered to be sub-tropical by nature and conducive to agricultural production (Greater Tubatse Municipality, 2015). The summer months (between October and March) tend to be extremely hot and humid with an average maximum temperature of between 32°C and 35°C and an average minimum temperature of between 18°C and 20°C. The winter months (May to July) tends to be warm to cool with an average maximum temperature of between 20°C and 25°C and minimum temperatures between 5°C and 10°C (Figure 5).

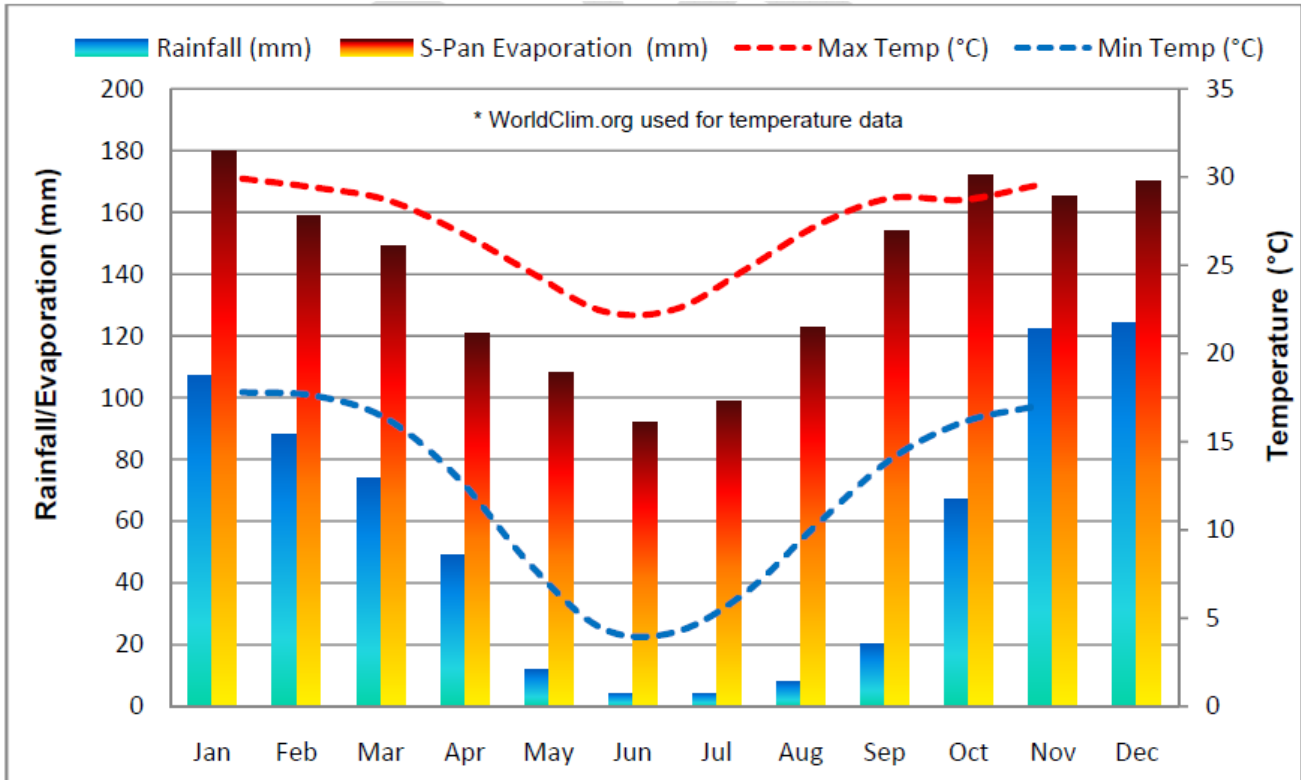


Figure 5: Summary of average climate for site

## II. Topography

The proposed Spitsvale Mine is situated on portions 24, 25, 26 and 28 of the farm Spitskop 333 KT and portions 8 and 22 of the farm Kennedy's Vale 361 KT in the Sekhukhune District north of Tweefontein Chrome Mine and south of Spitzkop Platinum Mine (**Appendix B**). The proposed mining area is located approximately 4 km south from the R555 and "Tweefontein" road intersection and approximately 17 km south west from Steelpoort. The project lies on the north-western slopes of the foothills of the Schurinksberg and is situated in the primary catchment of the Olifants River. Locally, the site is drained towards the Steelpoort River through various unnamed tributaries that originates in the surrounding mountains and hills. The relief changes more than 600 m from the Steelpoort River (~ 750 metre above mean sea level) to the edge of the quaternary drainage (B41J) surface water divide (~ 1600 mamsl). These elevated areas slope steeply down to the flatter areas where the proposed Spitskop Mine infrastructure will be located.

## III. Geological Environment

The description of the geology is based on the existing knowledge and literature of the region as well as on the BCR Minerals Exploration Geology Report (McQuade, 2015) and Specialist reports.

The proposed mining area is underlain by the Rustenburg Layer Suite / Dwars River rocks of the Archaean age Bushveld Igneous Complex and lies south of the Steelpoort Fault trending in a northeast-southwest direction. The Bushveld

Igneous Complex overlies the Transvaal Supergroup's Pretoria Group. Younger cover rocks (quaternary sedimentary deposits) occur throughout the area .

**Bushveld Igneous Complex (BIC)**

The Bushveld Igneous Complex (BIC) formed as massive crustal emplacements of predominantly mafic intrusive and extrusive rocks and comprises of suites of layered mafic complexes and sills that intruded the floor rocks of the Transvaal Supergroup. The BIC is divided into the Rustenburg Layered Suite, Lebowa Granite Suite, Rashoop Granophyre Suite and Rooiberg Group. The Spitsvale Mine is underlain by rocks of the Rustenburg Layered Suite (BIC).

**Rustenburg Layered Suite**

The Rustenburg Layered Suite comprises rock types ranging from dunite, pyroxenite, norite, gabbro and anorthosite to magnetite and apatite rich diorite, demonstrating a complete differentiation sequence for basic magma. The Rustenburg Layered Suite is subdivided into different limbs and(or) zones, i.e. the Eastern Limb, Western Limb and Northern Limb with each limb further sub-divided into the Upper Zone, Main Zone, Critical Zone, Lower Zone and Marginal Zone. The limbs and zones are based on geographical location and stratigraphic /lithology units respectively. The farms associated with the Spitsvale Mine are located in the Eastern Limb with associated rock units from the Main Zone and Critical Zone.

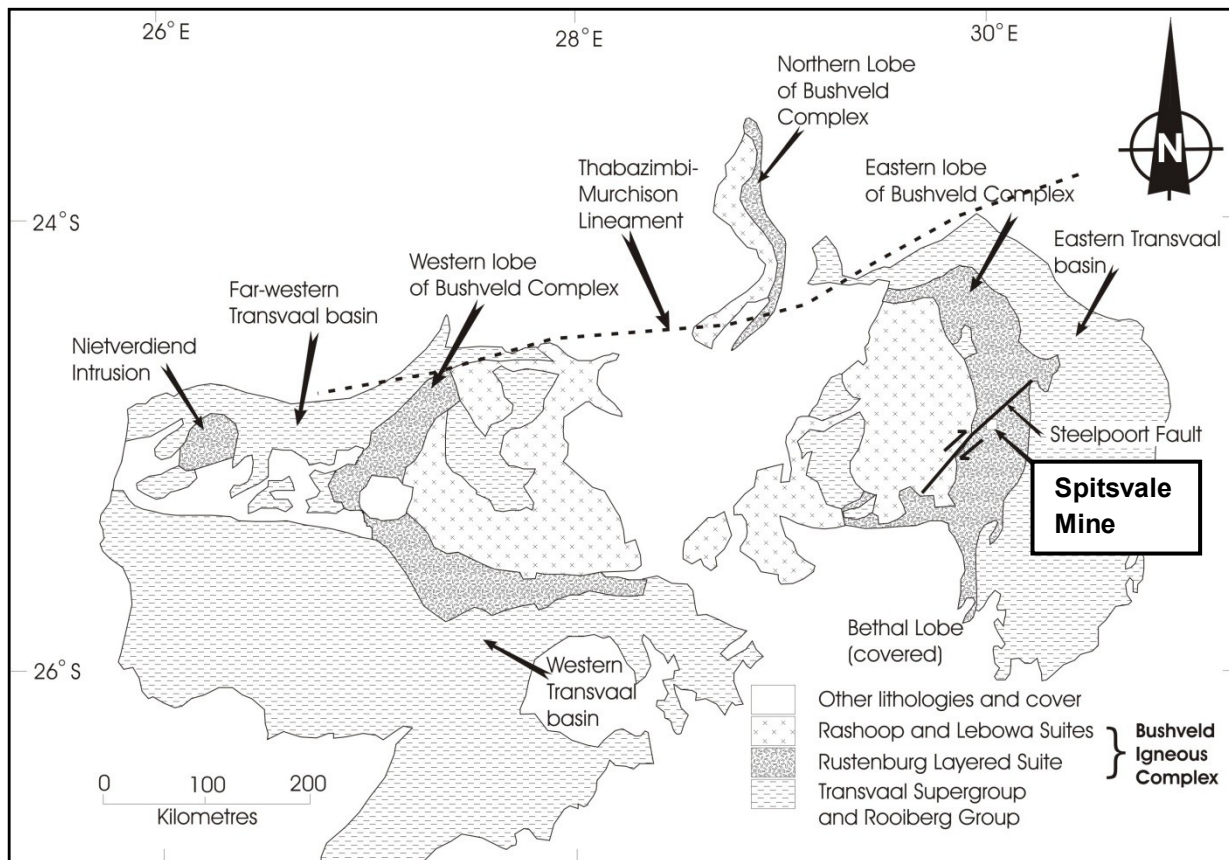


Figure 6: Approximate location of Spitsvale Mine and the Steelpoort Fault within the Bushveld Igneous Complex



The Main Zone consists of medium-grained norite with minor proxenite. The rocks contain variable amounts of quartz and biotite. The Lower Zone consists of pyroxenite and olivine bearing rocks, such as Bronzinite and Harzburgite. The Critical Zone, known for its chromite deposits, consists of layered chromite, pyroxenite, norite and anorthosite. The Main Zone is a thick succession of norite and gabbronorite with minor anorthosite and pyroxenite layers. The proposed mining target area is underlain by rocks of the Lower Critical and Upper Critical Zones within the BIC, consisting of chromitite, pyroxenite, norite, anorthositic norite and mottled anorthosite. The local geology associated with the Spitsvale Mine, targeting the Critical Zone dips at 8° to 14° southwest the Rustenburg Layered Suite, is well exposed in the Eastern Limb of the Bushveld Complex and displays a prominent MG1 to MG4, Middle Group Seams. These chromitite seams are hosted in the Mooihoek pyroxenite. The main target horizon for mining at Spitskop and Kennedy's Vale is the MG1 and MG2 Package Chromitite Layers.

The eastern margin of the study area is underlain by steeply dipping (floor) Pretoria Group sediments distributed around a north-south striking Steelpoort anticline. The Dwars River fragment in the southwest corner of the area is a floor inlier characterised by outcropping Steenkampsberg quartzite. The fragment probably represents a horst block of floor rocks with faulted contacts. Folding of quartzites and metamorphosed shale units occur on a variety of scales.

### ***Transvaal Supergroup***

The Transvaal Supergroup formed during the late Archaean to early Proterozoic eons and is preserved within three structural basins on the Kaapvaal Craton, one of which is the Transvaal and Griqualand West Basin. As described by Barnard (2000) and Foster (1984) this sequence consists mostly of volcanic rocks such as lava, tuff, andesite, basalt and rhyolite and sedimentary rocks which include quartzite, sandstone, shale, conglomerate and dolomite. Diabase sills and dykes form part of the Transvaal sequence as well. The Transvaal Supergroup underlies the Bushveld Igneous Complex.

### **Geological structures (faults and dykes)**

The Steelpoort Valley is occupied by a large-scale NE-SW to NNE-SSW striking fault zone, known as the Steelpoort Fault, which up to 10 km of apparent right-handed faulting has occurred. The northeast-southwest striking Steelpoort fault running the length of the Steelpoort Valley is found approximately 7 km north of the Spitsvale Mine. The fault formed a fault zone ranging from 200-250 m in width and is thus likely to affect groundwater flow. The presence of Steelpoort Fault splays have been interpreted from exploration boreholes, and show that the faults generally strike NE, NW and NNE, which may reflect imposed shear.

The Spitskop and Kennedy's Vale farms are intruded by several dolerite dykes, expected to be of several ages from the Waterberg and Karoo Supergroups. These dykes are generally steeply dipping and have varying thickness but do not seem to exceed 20 metres in thickness.

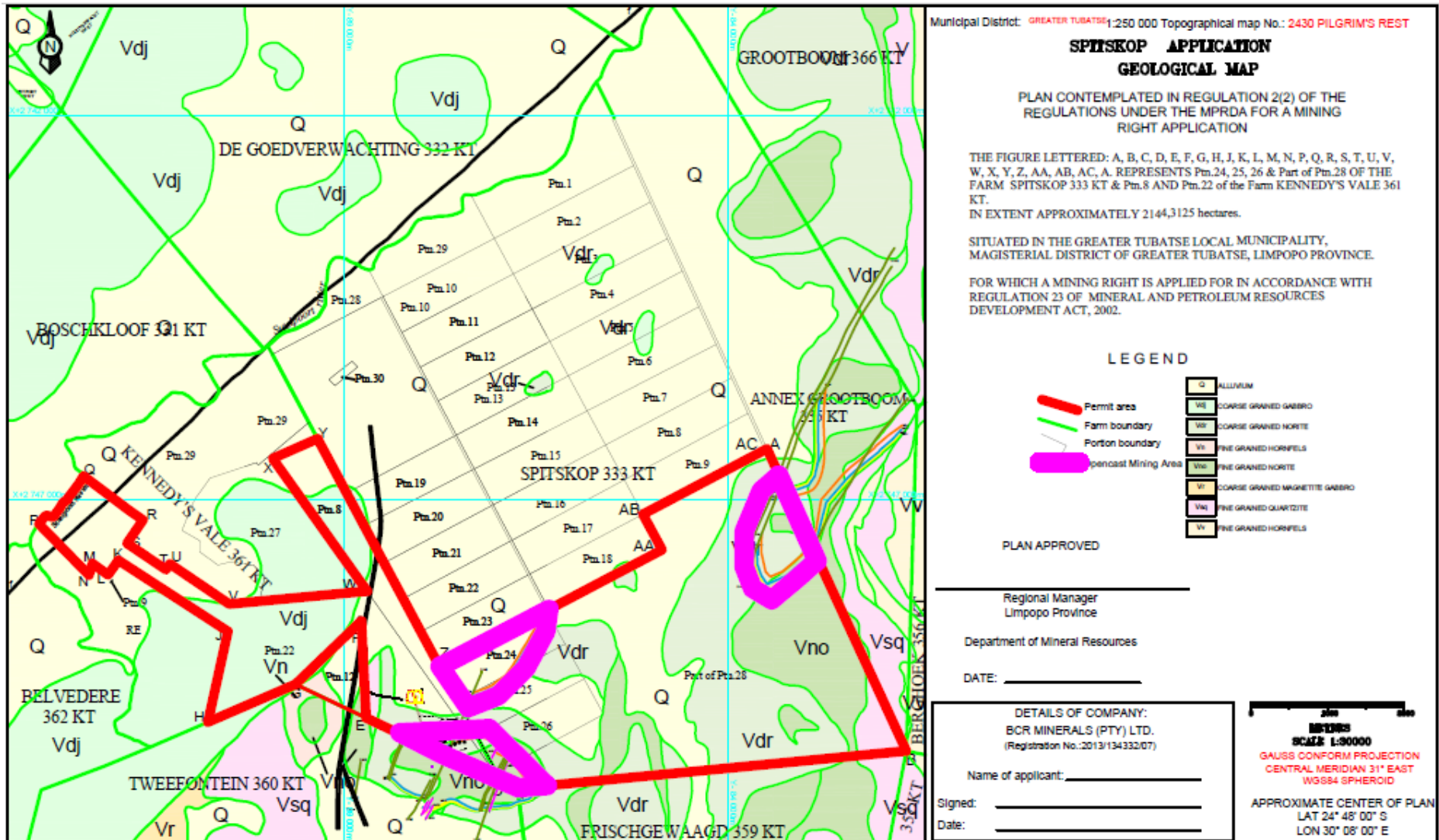


Figure 7: Regional geological map





#### IV. Air Quality

An Air Quality specialist was appointed by the EAP to investigate and assess the air quality impacts of the proposed activities.

The main objective of the Air Quality Impact Assessment is to determine the potential impact of emissions from the construction and operational activities associated with the proposed Spitsvale mine on ambient air quality.

As part of the Air Quality Impact Assessment, a Baseline Air Quality Assessment was undertaken to determine the prevailing meteorological conditions at the site, establish baseline concentrations of key air pollutants of concern, identify existing sources of emissions and identify key sensitive receptors surrounding the project site. Use was made of modelled MM5 meteorological data for the period 2012 – 2014. Baseline concentrations for dust fallout were analysed with the use of dust fallout monitoring data provided by the client for the period July – September 2015. A comprehensive air quality monitoring dataset was not available. It is recommended that baseline monitoring of dust fallout, PM<sub>10</sub> and PM<sub>2.5</sub> is conducted at the site for a period of at least 12 months.

The Air Quality Impact Assessment consisted of an emissions inventory and subsequent dispersion modelling simulations to determine TSP (as dust fallout), PM<sub>10</sub> and PM<sub>2.5</sub> concentrations associated with the construction and operational phases of the proposed Spitsvale mine. Comparison of the modelled concentrations was made with the South African Ambient Air Quality Standards and the South African National Dust Control Regulations in order to determine compliance.

The main conclusions based on the information obtained during the Baseline Assessment can be summarised as follows:

- Based on the prevailing wind fields for the period January 2012 to December 2014, emissions from proposed operations at Spitsvale mine will likely be transported towards the south-west and north-east. During the day time emissions are likely to be transported in a south-westerly direction. In the night time emissions are likely to be transported towards north-east. Moderate to fast wind speeds observed during all time periods may result in effective dispersion and dilution of emissions from Spitsvale mine.
- A comprehensive air quality monitoring dataset for PM<sub>10</sub> and PM<sub>2.5</sub> concentrations was not available and could not be presented for the study area. Dust fallout concentrations at the proposed mine for the period July to September 2015 were relatively low and did not exceed the residential dust fallout standard of 600 mg/m<sup>2</sup>/day and ranged from approximately 57 – 569 mg/m<sup>2</sup>/day. However, a more comprehensive dust fallout monitoring dataset is required to assess the baseline dust fallout rates for the study area.
- Existing sources of emissions surrounding the proposed Spitsvale Mine are mainly associated with exiting mining operations, vehicle dust entrainment on unpaved roads, wind erosion from exposed areas and potentially domestic fuel burning in surrounding residential areas.



- There are residential areas located within close proximity (<10 km) and along the proposed mine's boundary line. These include Steelpoort, Ga-Mampuru, Ga-Manapane and Ga-Matate. There are also a couple of small dwellings and communities located within the mine's boundary line near the centre of the haul route.

The main conclusions of the Impact Assessment for the mine can be summarised as follows for the construction and operational phases:

- Based on the dispersion modelling plots for the construction phase the following conclusions can be made:
  - Predicted incremental dust fallout rates beyond the mine boundary are in compliance with the allowable dust fallout limit of 1200 mg/m<sup>2</sup>/day for non-residential and 600 mg/m<sup>2</sup>/day for residential areas.
- Based on the dispersion modelling plots for the operational phase the following conclusions can be made:
  - Predicted incremental dust fallout rates beyond the mine boundary are in compliance with the allowable dust fallout limit of 1200 mg/m<sup>2</sup>/day for non-residential and 600 mg/m<sup>2</sup>/day for residential areas.
  - Predicted incremental PM<sub>10</sub> concentrations beyond the mine boundary are in compliance with the daily average standard of 75 µg/m<sup>3</sup> and the annual average standard of 40 µg/m<sup>3</sup>.
  - Predicted incremental PM<sub>2.5</sub> concentrations outside the mine's boundary are in compliance the daily average standard of 40 µg/m<sup>3</sup> and the annual average standard of 20 µg/m<sup>3</sup>.
- Although the predicted concentrations due to proposed operations are expected to be low beyond the mine boundary, it should be noted that exceedances of the PM<sub>10</sub> and PM<sub>2.5</sub> standards were observed inside the mine boundary along the main haul route and near the mining areas. There are some small communities and dwellings that reside within the mine's boundary and near to the haul route. Therefore, it is recommended that a detailed dust management plan is developed and incorporated during the design stages of the mine. The plan should focus on sources of dust located in close proximity to the residential receptors within the boundary.

The detailed report is attached as **Appendix J**.

## V. Noise

A Noise Impact specialist was appointed by the EAP to investigate and assess the current and predicted noise factors of the baseline environment.

A noise impact assessment (ENIA) was completed for the following reasons:

- The proposed Spitsvale mining activity is situated within 1, 000 m of a noise-sensitive development (SANS 10328:2008);
- It is a controlled activity in terms of the NEMA regulations and a ENIA is required, because it may cause a disturbing noise that is prohibited in terms of section 18(1) of the Government Notice 579 of 2010; and
- It is generally required by the local or district authority as part of the environmental authorization or planning approval in terms of Regulation 2(d) of GN R154 of 1992.



This study included the following:

- A baseline noise assessment;
- Identification of sensitive receptors; and
- Recommendations on managing noise impacts.

The section to follow summarises the determination of baseline findings of the Noise Impact assessment.

## **Receptors**

Residential areas and potential noise-sensitive receptors were identified using tools such as Google Earth ® with the areas up to a distance of 1,000m from closest project boundary. This was supported by a site visit to confirm the status of the identified dwellings. Eight receptors in the study area were numbered from NSD01 to NSD08.

NSD02 to NSD04 are all houses within a community, the numbers represent the closest dwellings to the project footprint (except for NSD03). NSD03 is an educational facility within the community, namely the Dithamaga Primary School. It must be noted that educational facilities have no special Rating Levels, only indoor design levels. This facility is also only in use during daytime hours (06:00 – 22:00, SANS10103:2008 daytime criteria) and is vacant during the night.

NSD05 to NSD06 are dwellings of Mr. Hendrik Mabelane. NSD07 represents a commercial facility (office) of a developer within the study area. NSD08 is a community in the furthestmost northern section of the project footprint, namely the Tubatse community.

## **Measurements**

Ambient sound levels were measured at two locations from the 22nd till 26th October 2015. One class-1 SLMs was used for measurements. The sound level meter would measure “average” sound levels over 10 minutes periods, save the data and start with a new 10 minute measurement until the instrument was stopped.

The measurement locations were numbered from BCR01 to BR02. During site investigations three feasible localities were investigated for longer-term measurements. Where longer-term measurements were not feasible (e.g. 12 hours or longer), shorter term measurements were conducted.

Due to safety limitations of equipment it was selected to implement longer term measurement equipment at the more secure dwelling of Mr. Hendrik Mabelane (NSD05). This measured locality is illustrated as BCR01. The selected measurement localities property had only one singular dwelling adjacent to it. Two communities (represented by NSD01 (Tubatse) and NSD02 – NSD04 in this document) was app. 3km and 700m respectively from measurement locality. The measurement locality would likely be representative of the two communities Rating Level without extraneous noises



(community sounds) impacting on measurements. BCR02 was a measured point conducted at the Tubatse community itself.

## Summary

Considering the  $L_{Aeq,16/8hr}$  daytime and night-time measurements a suburban Rating Level is proposed for the study area. At times during night-time the  $L_{A90}$  and impulse setting may have indicated a rural setting, albeit briefly. However considering the entire set of  $L_{Aeq,10min}$  set and  $L_{Aeq,8hr}$  it is more akin of a suburban area. There is a moderate-high confidence in the ambient sound levels measured and the subsequent Rating Levels determined.

The section to follow summarises the key findings observed during the investigation.

## Investigated Scenario

Assessments done in this document are as recommended by the National/International guidelines and regulations SANS 10103, SANS 10328 and GN R154. The report considers a worst-case scenario, evaluating the potential noise impact during peak hours.

Two phases were investigated and modelled. The construction phase, which entails the stripping of topsoil and overburden at open cast pits. The second phase is the operational, which entails the truck and shovel open cast mining, stockpile maintenance as well as new plant operations.

## Conclusion

Considering this approach, there is a risk of a noise impact of medium-high significance during peak construction and operational noise levels and at the Tubatse community (NSD01) directly adjacent to the proposed furthest northern pit. The assessment made use of the SANS 10103:2008 guideline and International Finance Corporation noise limits for residential areas. With proposed mitigation options implemented (see EMPr) an acceptable low significance can be achieved.

As a result of the baseline findings and the modelling of the expected impacts, the section to follow summarises the recommendations for the management and mitigation of expected noise impacts.

## Mitigation options

The most important mitigation options recommended would be to limit operations on the open cast pits adjacent to the Tubatse community to daytimes only (during all phases). Berms/barriers need to be constructed along either the noise sources or the receivers. In order for the berms/barriers to successfully act as an acoustical screen specifications indicated in this document mitigation section must be adhered to. Communication between the Tubatse community and the developer need to be implemented and maintained, highlighting the outcome of this study.



## Measurements and Audit Programme

An annual Acoustical Measurement & Audit Programme is recommended to be conducted during the construction and operational phase. Measurements should be collected in 10-minute bins over a 48 hour measurement period. Variables and measurement recommended settings to be analysed include  $L_{Amin}$ ,  $L_{Aeq}$ ,  $L_{AMax}$ ,  $L_{AMin}$ ,  $L_{A10}$ ,  $L_{A90}$  and spectral analysis. Noise measurements must be continued as long as there are potential receptors living within 1,000m of the boundaries of the mining operation, or as long as a valid noise complaint is registered.

Feedback regarding noise measurements should be presented to all stakeholders and other Interested and Affected parties in the area. The feedback platform and interval periods should be defined by the developer, with an annual feedback period recommended.

The following recommendations were made by the Noise Specialist:

- Feedback regarding noise measurements should be presented to all stakeholders and other Interested and Affected parties in the area.
- The feedback platform and interval periods should be defined by the developer, with an annual feedback period recommended.
- If the layout of the mine changes significantly (or assumptions change) used in this report, that this Environmental Noise Impact Assessment be reviewed with the appropriate information supplied by the developer, including:
  - Locality of the noise source;
  - Operational time of the noise source; and
  - If possible specifications regarding the noise source

The detailed report is attached as **Appendix K**.

## VI. Biodiversity (Terrestrial Ecology)

As part of the investigation of the potential impact associated to the proposed mining activities, a number of specialists were appointed by the EAP. The sections to follow will summarise the findings from the reports.

### a. Terrestrial Fauna

The SANBI SIBIS and ADU databases were queried regarding vertebrate fauna and arachnid species historically recorded in the study area and surroundings. The likelihood of such species still occurring in the area was verified according to Apps (2000), and species of conservation concern or that are protected and most likely to occur in the study area listed. Protected and red data species that may be expected to occur on the study area are listed under results in the Biodiversity Assessment report (**Appendix L**).



The following two terrestrial fauna species were found to be of concern in the investigation:

- *Chamaeleo dilepis subsp dilepis* (Common Flap-neck Chameleon) – This species are protected by the Limpopo Environmental Management Act, Act 7 of 2003.
- *Platysaurus orientalis subsp fitzsimonsi* (FitzSimons' Flat Lizard) – This species are considered to be near threatened. Although it was not observed during the investigation it is highly likely that they will be found in this particular habitat.

#### **b. Avi-Fauna**

As per instructed by the Department of Mineral Resources in the acceptance letter of the submitted Scoping, an Avifauna survey was conducted.

The objective of the survey was mainly to determine presence or absence of the respective avifaunal species, and made no attempt to estimate numbers (census) of the various species on the site. The emphasis was on determining whether any Red-Data species were present and to what extent any mining activities might threaten such species. The survey was conducted on 18<sup>th</sup> and 19<sup>th</sup> January 2016.

A total of 110 species was recorded during this survey. These are listed in the attached detailed report (**Appendix M**). High recording rates were obtained for conspicuous and common species which occurred over a wide range of habitats such as European Bee-eater, Dark-capped Bulbul, Long-billed Crombec, Cattle Egret, Grey Go-away-bird, Hadeda Ibis, Red-faced Mousebird, Tawny-flanked Prinia, White-browed Sparrow-weaver, Barn Swallow, Lesser Striped Swallow and Cape Turtle Dove. Totals indicate that Area 1 (with 80 species) yielded the greatest number of species, but this is probably a reflection of the time of day that this area was surveyed – early morning during “dawn chorus”.

The *Falco Biarmicus* (Lanner Falcon), is the only “Vulnerable” species known to potentially occur on the Spitsvale Mine.

The following mitigation measures were recommended to reduce the possible impacts on the avifauna species, with specific reference to the Lanner Falcon:

- To leave, as far as is possible, as much of the natural indigenous bush undisturbed and in its pristine state.
- Route connecting roads as close as is possible to already developed sites or roads.
- Restrict or prohibit any off-road driving in areas of pristine indigenous bush.
- Route power lines, if applicable, along these connecting roads, or better still, route them underground.

The general conclusion of the avifauna survey, and data acquired from the Southern African Bird Atlas Projects (SABAP<sub>1</sub> and SABAP<sub>2</sub>) have not recorded any species whose Red Data status might compromise the further development of the proposed project. The Lanner Falcon is the only recorded species that is listed as “Vulnerable” in the Red Data List. This record came from the SABAP<sub>1</sub> database and is now about 25 years old. It was not recorded during this survey, and no suitable nesting cliffs are known to be present on the Spitsvale Mine area. While Spitsvale may constitute part of the



species' foraging range, the area of the site is relatively small ( $\pm 200$  ha) and development here should have minimal adverse consequences for any resident or migrant Lanners.

### c. Bat Survey

As per instructed by the Department of Mineral Resources in the acceptance letter of the submitted Scoping, a Bat survey was conducted.

No specialist species of bats were identified during the field study, nonetheless, with additional deterioration to the landscape and the loss of habitat due to vegetation clearing may cause a shift in the species composition within the bat community to a bias towards more hardy species such as the Egyptian free-tailed bat.

Due to the prevailing weather conditions and lunar cycle which were not conducive to active trapping and may not have been favourable to all species foraging (windy, overcast with potential rain and a waxing crescent – gibbous), the transects and trapping night can only provide a baseline indication of the bat species and activity over the site. This baseline report should be followed by annual/biannual surveys to monitor bat activity, species compositions and population trends as mining activities proceed.

The following mitigation measures were suggested:

- Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely necessary.
- Discourage vehicles from driving through the natural vegetation where mining activities are not taking place.
- Prohibit mining plant and trucks from washing or dumping material near a water course (wet or dry) to prevent the pollution of natural water bodies.
- Prohibit any chemical and/or heavy metal from being released into the environment.
- Manage all waste water and stormwater to prevent pollution to water bodies.
- To erect security lights/spot lights only near infrastructure/where absolutely necessary.
- Mitigate night time noise to as low as possible, particularly during peak foraging times.
- Restrict blasting activities to daytime hours.

Bat activity and trends in population numbers are of particular interest to determine the long-term effects of opencast mining of Spitsvale, it is suggested that a passive recording monitoring system be put in place and maintained by a specialist to determine the impacts of active opencast mining on bat populations in relation to landscape changes, noise pollution, light pollution and water quality.

The detailed report is attached as **Appendix N**.



#### d. Flora

A field study was conducted from the 2-6<sup>th</sup> January 2016 as well as a desktop of the associated area based on the data from the POSA SANBI website.

The presence of several species of conservation concern was verified during field observations.

These plant species identified included:

- 10 species endemic to Sekhukhuneland
- 20 further species endemic to RSA
- At least 9 red data species
- At least one NEMA:BA (ToPS) species
- At least 5 NFA protected tree species
- At least 7 LEMA protected plant species, additionally tree-mosses observed

Of all of the above, several will be moderately to severely affected by the proposed mining activities.

The Vegetation Associations identified and delineated in the Biodiversity assessment are as follows (also indicating sensitivity):

- *Themeda triandra* – *Diheteropogon amplexans* Grasslands (**Sensitivity: HIGH - Avoid as far as possible**): These are primarily grass-dominated slopes, with either a relatively sparse shrub cover or only small clumps of higher vegetation.
- *Cyperus sexangularis* – *Flueggea virosa* Ephemeral Drainage Lines (**Sensitivity: No Go Area – only suitable crossings permissible**): These include small rivers on more level areas as well as rocky washes and ravines higher into the mountains.
- *Acacia tortilis* – *Dichrostachys cinerea* Dry Mixed Bushveld (**Sensitivity: Medium-Low**): The extent of this association is relatively limited, found on more level areas and has been variously degraded, often leading to a diminished herb-layer and a heavily encroached shrub layer.
- *Kirkia wilmsii* – *Terminalia prunioides* variable Bushveld (**Sensitivity: Medium-High: Avoid large tree clumps and individuals as far as possible**): This is found mostly on the lower footslopes of mountains and as an ecotone to the plains below, but also on rocky mountain scarps as well as undulating rocky flats
- *Hippobromus pauciflorus* – *Rhoicissus tridentata* Rock Outcrops (**Sensitivity: HIGH - Treat as No Go Area as far as possible**): This vegetation is highly variable, with no two outcrops with the same vegetation. Generally it is found between large boulders – either on mountain plateaus or on mountain slopes. The high niche diversity accounts for a very high biodiversity of these pockets of vegetation.





- *Combretum hereroense* - *Euclea sekhukhuniensis* low bushveld (**Sensitivity: No Go, only limited access roads permissible**): Very variable, this vegetation type is found on more level areas between slopes or on the plains and extensive donga systems within the study area, where *Euclea sekhukhuniensis* can form relatively dense stands. The latter species is a narrow endemic – although currently abundant, its limited distribution makes its populations highly vulnerable to the impacts of open-cast mining and other transformative development.

From a terrestrial ecological perspective, the proposed mining operations will have a significant local negative impact.

It is recommended that strict mitigation measures are diligently implemented as well as obtaining all necessary authorisations or permits required for any associated activity. Recommendations on the proposed mitigation measures are found in the detailed report attached as **Appendix L** and have been considered in the EMPr.

#### e. Invasive Plants

As part of the field study conducted from the 2-6<sup>th</sup> January 2016, a number of listed invasive plants were identified. According GN R. 598 the following alien invasive species have been observed on the associated land portions:

##### Category 1b:

- *Argemone ochroleuca*
- *Datura stramonium*
- *Lantana camara*
- *Melia azedarach*
- *Pennisetum setaceum*
- *Opuntia* species

##### Category 2:

- *Agave sisalana*

##### Category 3:

- *Morus alba*

A detailed alien invasive species management plan will have to be implemented during prospecting, construction, and mining and maintained until decommissioning has been completed. This management plan must also ensure following regulations of NEMA: BA are adhered to:

- Conveying, moving or otherwise translocating any specimen of a listed invasive species
- Spreading or allowing the spread of any specimen of a listed invasive species



Recommendations on the proposed mitigation measures are found in the detailed report attached as **Appendix L** and have been considered in the EMPr.

## VII. Soils

A Soil specialist was appointed by the EAP to investigate and assess the current and predicted soil factors of the baseline environment as well as determining the possible impacts of the proposed activities on the soil environment.

The objectives of the investigation included a soil survey and mapping of study area, measurement of the effective depth of the soil(s), assessment of agriculture potential of soils, assessment of the erodibility and misuse of soils, mapping of land use & land capability, formulation of a soil stripping guide and plan, determination of chemical, mineralogical and physical properties of representative soil forms, assessment of suitability of soils for rehabilitation purposes and an impact assessment of topsoil stripping on soils with recommendations to mitigate negative impacts.

From the assessment it is conclusive that the dominant soil forms recorded and identified according to the Taxonomical Soil Classification System of South Africa are Hutton, Oakleaf, Bloemdal, Mispah and Glenrosa soil forms. The effective depth of the Hutton, Oakleaf and Bloemdal soils exceeds 300mm inclusive of the Orthic A, Red Apedalic and Neocutanic B – Horizons. The soils from the study area are weathering products from anorthosite and pyroxenite. Anorthosite rock is characterised by a predominance of plagioclase feldspar and minimal pyroxene, ilmenite and magnetite. Pyroxenite is an ultramafic rock consisting essentially of the minerals of the pyroxene group such as augite, diopside, hypersthene, bronzite or enstatite. Pyroxenites are classified into clinopyroxenites, orthopyroxenites and websterites. The soils are rocky shallow soils on the mountainous areas with an Orthic A – Horizon developed to maximum 300mm on hard rock and/or weathered rock material. In the low laying areas the soil catena is characterised by deep red horizons covered by an Orthic A - Horizon 300mm characterised by high organic material, micro-organisms and seed content representing a delicate micro-habitat overlaying Red Apedalic and Neocutanic B - Horizons >1,2m deep. The Red Apedalic and Neocutanic B-Horizons are characterised by well aerated and drained sandy soil profiles with an average clay content of 10-15% represented by predominantly 1:1 clay minerals, i.e. kaolinite and oxides of Fe and Mn. Signs of a ferricrete layer is present due to the presence of a shallow fluctuating water table causing the precipitation of Fe and Mn under fluctuating aerobic and anaerobic soil moisture conditions.

The agricultural potential (Table 3, p20) of the Hutton, Oakleaf and Bloemdal soils is considered medium to high under dryland (450mm/y rainfall) and irrigation conditions (>10-15mm/week 33-1,500kPa plant available water).

Evidence of natural soil erosion was observed on the soils during the investigation. Careful consideration should be given during mining to minimise impacts on the soil that could enhance soil erosion. It could be considered as contributing to the surrounding environment for the mine to implement artificial measures to minimise natural soil erosion – although the current erosion observed during the assessment is natural and was not caused by the mine.



The current land use includes 4,48% mining & industrial, 87,69% natural veld, 3,75% ploughed land, 3,46% settlement and 0,62% wetlands. Land capability includes 17,42% arable, 0,62% wetland, 76,14% wilderness with 2,36% occupied by mining & industrial and 3,46% settlement of the total study area investigated.

A minimum of topsoil stripping will occur during the mining process due to the fact the mining process will be confined to the steep slopes of the mountainous areas. A soil stripping and stockpiling strategy was compiled and is included in Table 7, p41. From the soil data considering all available topsoil on Portions 8 and 22 of Farm Kennedy's Vale 361KT and Portions 24, 25, 26 and 28 of the Farm Spitskop 333KT an estimated total 3,303ha could potentially be covered 300mm thick at a bulk density of 1,275kgm<sup>3</sup> during rehabilitation taking into consideration a 10% loss from the 11,010,000m<sup>3</sup> available topsoil due to handling, compaction etc.

The soils are characterised by neutral pH values (5,3 and 7,2) and low electrical conductivity values (<250mS/m). Under these conditions plant available nitrogen (15-20mg/kg), phosphorus (10-15mg/kg) and potassium (>50mg/kg) are readily available for plant uptake and sustainable plant growth. The Orthic A-Horizon is typically characterised by a low dense structure and texture distribution of approximately 65% sand, 20% silt and 15% clay with drainage properties in order of 10mm/h. The dominant clay mineral in the Orthic A – Horizon, Yellow & Neocutanic B – Horizon is kaolinite (1:1 layer silicate), with a low buffer capacity due to the low cation exchange capacity (<10cmol+/kg).

The soil horizons specified in Section 5.1 p17 of the Hutton, Oakleaf and Bloemdal are suitable for rehabilitation purposes. The potential impacts and reasons/activities with proposed mitigation measures on the soil due to mining infrastructure related activities include:

- ***Loss of topsoil:***

Topsoil will be loss due to stripping, handling and placement of the soil associated with the pre-construction land clearing, operational clearing during mining, and during rehabilitation and it is recommended to strip all usable soil within mining rea, irrespective of soil depth. It is imperative that discretion is used during stripping and stockpiling to separate different soil layers for future use. This will be a function of the soil types comprised out of different soil layers, i.e. topsoil (0-300mm) should be stripped and stockpiled separately from all other horizons due to its chemical, mineralogical, mechanical, plant seed and microbiological properties. Some sub-horizons could be stockpiled together and it is recommended that guidelines set out in the soil stripping and stockpiling protocol comprised by a soil scientist with experience in rehabilitation of disturbed land are used.

- ***Change to soil's physical, chemical and biological properties:***

There is a high probability that topsoil will be lost due to wind and water erosion, which will alter the soils properties. Stockpiling and subsequent mixing of soil layers during handling will ultimately have a negative effect on altering the basic soil properties. It is suggested to implement live management and placement of topsoil where possible, improve the organic content of the soils, and maintain fertility levels through fertilisation and to curb topsoil loss as much as possible.



Subsoil should be stockpiled separately from topsoil and managed properly to prevent loss, mixing with topsoil and wetland soils. Wetland soils of pans to be affected should be stripped and stockpiled separately for future use during rehabilitation. These soils can be used to construct wetlands during rehabilitation considering surface water flow and low lying areas to enhance wetland functions and biodiversity.

- ***Cumulative effect of the soil:***

Alteration of the natural surface topography due to reprofiling during construction after stripping will have an accumulation effect on the soils and careful consideration should be given to minimise compaction and ensure free drainage preferential surface water pathways. Stripping, transportation and stockpiling of topsoil and subsoil have an effect on chemical, physical and mechanic properties of the material. The texture (sand, silt, clay content) will be disturbed and ultimately the structure of the material will be changed. The clay content (particles <0,002mm) determines the cation exchange capacity of the material and depending on the type and quantity of the clay present (1:1 layer silicates) the retention capability of the soil material can be changed. This will affect nutrient retention and potentially chemical balances in the diffuse double layer around the clay particles. The major nutrients nitrogen, phosphorus and potassium might become deficient at the time of rehabilitation and will have to be supplemented. Ca:Mg, Mg:K and Ca+Mg/K ratio's need to be monitored and optimised before rehabilitation together with potential pH alterations (acidification and/or alkalinisation) and salinisation that would inhibit plant growth. Permeability, infiltration capacity and water retention will be affected upon disturbance of the texture and structure of top and subsoil and needs to be carefully assessed during rehabilitation. A water balance assessment should be conducted to determine if reconstructed profiles will have the capacity to store plant available water between 33 – 1,500kPa to sustain selected plant growth for rehabilitation purposes. The plasticity index, compaction, settlement, bearing capacity as function of texture and structure will be altered during stripping and stockpiling and will have to be considered addressed and optimised for the purpose to establish free flowing grassed rehabilitated systems.

The detailed report is attached as **Appendix O**.



## VIII. Hydrology

A Hydrology specialist was appointed by the EAP to investigate and assess the hydrological baseline environment.

The scope of works by this study included the following:

- Baseline Assessment - baseline climatic data used in hydrological calculations. This included the sourcing of appropriate rainfall data, site-specific rainfall depth/duration/frequency analysis as well as a regional and local hydrological assessment.
- Site examination – This resulted in a better understanding of the dominant hydrological flow regimes at the site as well as help provide input for flood hydrology calculations.
- Surface Water Sampling - Monitoring of surrounding surface water obtaining an appropriate baseline. This assisted in being able to monitor the potential impact the operation will have on receiving water resources over time.
- Flood Assessment - modelling of flood based on the adoption of the 100m buffers.
- Conceptual Storm water Management Plan - This was developed based on South African best practice guidance and conceptualized through mapping and indicative design drawings.
- Static Water Balance - This was developed for average wet and dry seasons based on monthly input data.

Appropriate baseline information including rainfall data, depth-duration-frequency design rainfall estimates, evaporation data as well as both regional and local hydrological characteristics have been considered for the proposed Spitsvale Mine. It is recommended that an Automatic Weather Station be installed at the site.

Flooding at the site was investigated but limitations in available site elevation data meant that a reliable flood model (for flood line modelling) could not be built. Instead, a buffer approach (100m) for all non-perennials within the site boundary was adopted. There is a significant amount of infrastructure located within these buffers and intersecting watercourse. These instances will need to be considered during the water use license process (Section 21 c and i). It is recommended that flood lines are modelled (when detailed elevation data becomes available) for streams where flooding of infrastructure are a concern in order to ensure complete compliance with GN704. Peak flows and hydrographs were developed as part of this study for various sub-catchments over the site. These outputs are intended to inform any future flood modelling.

Stream crossings and associated bridge and culvert designs have not been considered in this assessment but in principle, these crossing needs to be sufficiently sized to provide capacity to convey the 1:100 year flood event over the expected life of the structure to minimise impacts and ensure that the natural flow regime can be maintained as far as possible.

The conceptual storm water management plan has been developed based on the requirements of GN 704. This was done by identifying clean and dirty areas and managing them accordingly. Dirty water producing areas have been isolated by diverting upstream clean water around them via clean water diversions and dirty water produced in dirty areas has been



routed to dirty containment facilities via diversions. Stormwater infrastructure has been developed based on the contributing catchment areas and catchment characteristics, and has been sized to contain the 1:50 year flood event. It is recommended that discussions are held with the DWA regarding the lining requirements for storm water management infrastructure, to ensure that the flood hydrology calculations can be revised accordingly during detailed design and prior to construction of infrastructure. The “recommended volumes” of the proposed dirty storm water dams should be investigated further during the detail design phase to accommodate operational storage volumes, without compromising the ability of the dams to contain the “minimum volumes” as per GN 704 compliance. It is recommended that priority is given to the reuse of dirty water within the process water circuit.

Three surface water samples were taken during the site visit. This water quality monitoring is aimed at ensuring baseline water quality can be quantified prior to mining with potential impact subsequently monitored and quantified over time. To this end, additional sampling points have also been recommended. As part of the monitoring program going forward, samples should be taken monthly for at least the first year of operation. This can be revised to quarterly monitoring if no concerns are highlighted. This will however need to be discussed with the DWS as they are the ultimate custodians of the water resources. The monitoring should include the standard analysis of major cations/anions as well as ICP scan for metals. Waterlab in Pretoria has appropriate accreditation for such analysis to be undertaken.

An analysis of mean annual runoff was undertaken as part of the study using the WR2012 dataset. The WR2012 mean annual estimate of runoff for the site was estimated according to the dirty area contained (comprised of stockpiles, opencast areas and containment facilities) and totalled 1.097km<sup>2</sup>. This accounts for 0.022 million m<sup>3</sup> of MAR that will be contained by the site (0.15% of quaternary catchment B41J MAR)

Wet and dry season static water balances have been developed for the project based on monthly input data from various specialists. Based on the model results, there seems to be an excess of approximately 22 527m<sup>3</sup>/month and 8 065m<sup>3</sup>/month for the wet and dry seasons respectively. This excess water will need to be appropriately managed and if deemed necessary to discharge, meet the appropriate discharge quality guidelines and associated discharge IWULA conditions. It is recommended that the water balance be updated once more specific domestic and process water reticulation volumes are known and refined annually during the life of the project. Flow meters should be installed in the domestic and process water circuits to provide actual data on water flows so that the water balance can be updated accordingly. A suitable dynamic water balance simulation model could also be developed and used as a decision support tool as mining progresses.

The detailed report is attached as **Appendix G**.



## IX. Geo-hydrology

A Geo-hydrological specialist was appointed by the EAP to investigate and assess the geo-hydrology of the baseline environment.

The study included the following:

- Hydrocensus and sampling of selected boreholes aimed at identifying potential groundwater users;
- Baseline assessment of Locality, Topography, and climate;
- Determination the status quo of the groundwater systems prior to mining; and
- Develop a site specific numerical groundwater flow model.

The developed site specific groundwater flow model is based on available and determined aquifer parameters in order to:

- Estimate expected groundwater flow rates into the opencast mine workings during life of mine (to feed into overall water balance for the site).
- Investigate the impacts of mine inflows on the surrounding aquifers.
- Evaluate the potential impacts of mining operations (e.g. stockpiles) on the ambient groundwater quality using a conservative advective-dispersive transport model.

The section to follow summarises the findings and recommendations as a result of the investigation. The detailed report is attached as **Appendix P**.

### Summary

The aquifers in the model area were conceptualised as a shallow weathered and alluvial aquifer underlain by a deeper fractured aquifer system within the Bushveld Igneous Complex, dissected by numerous discontinuities (fractures and dykes) in the area. Utilising data from boreholes sampled during a hydrocensus, the site specific groundwater quality is described as a magnesium-bicarbonate water facies, typical of shallow groundwater in the Bushveld Igneous Complex.

Elevated concentrations of chromium and nitrate are noted and could be of natural and/or anthropogenic origin. While elevated chromium concentrations are often related to groundwater contact with the ore body itself, elevated nitrate concentrations might represent blasting residues from upstream mining activities or, as in many cases in the Bushveld Igneous Complex, naturally occurring nitrogen presence in the soil and rock formations. Additional investigations in this regard are recommended.

The conceptual hydrogeological model was converted into a three-dimensional (four-layer) numerical finite-element groundwater model using the modelling software SPRING. Using available data, a satisfactory steady-state calibration of the model was achieved. The proposed BCR open cast mine workings was incorporated into the calibrated groundwater flow model by updating the digital elevation model for the pit area and assigning a free seepage boundary to the pit,



assuming that any groundwater entering the pit is pumped out. The model was then used to estimate the steady-state inflow rates into the fully developed pit based on annual average groundwater recharge rates.

The modelling results confirmed that no groundwater seepage is to be expected into the open cut along the Klarinet and Tubatse Koppie resource areas due to the deeper groundwater levels below the bottom of the proposed pits. However, groundwater flow into the Spitskop Flats open pit have to be dewatered at a rate of around 2.8 l/s. The dewatering rates are relatively low because of the low conductivity of the host rocks and small drainage area upstream of the pit. The reduction of groundwater baseflow is predicted to be insignificant (based on the low inflow rates).

No significant impact on the water quality is expected due to the low sulphur content in waste material from other mines in the area and a likely neutral to alkaline leachate quality with slightly elevated mineralisation in comparison to the ambient groundwater. The potential plume emanating from the stockpiles and/or waste rock dumps will be limited in extent and expected to diminish post-closure.

## Recommendations

The following recommendations are proposed to monitor and minimise potential impacts on the receiving groundwater environment:

- An environmental monitoring programme should be established in order to monitor groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).
- A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to fig) to be included into a monthly/quarterly monitoring programme for the BCR Minerals operation.
- The parameters to be analysed should comprise the following:
  - Physico-chemical parameters (pH, EC, TDS);
  - Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>);
  - Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and
  - Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).
- Emphasis should be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.
- Recording of pit dewatering rates:
  - Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.





## X. Human Health

The Environmental Health determinants and associated impacts (both positive and negative) as a result of activities during the three phases of mining may be summarized as follows:

- Social determinants of health
  - Activities associated with different phases include an increase in male job seekers and workers during construction and an increase in women and children (vulnerable age group) during operation.
  - The use of local labour should have a positive impact on local businesses and thus the local economy. Identification of local capacity-building opportunities will be crucial to maximise employment opportunities.
  - The main estimated **negative** impacts associated with issues related to social determinants of health, before mitigation, include a change in social cohesion which has the potential to lead to acts of violence including xenophobia, crime, substance abuse, and interpersonal violence as well as an increase in psychosocial problems such as depression. The influx of jobseekers should thus be managed proactively to minimize social impacts on infrastructure and service delivery.
  - The change in land zoning status for future mining are regarded as **positive** as associated activities would likely ensure long-term social development support for the core communities and will create opportunities for job-creation in the secondary and tertiary economy sectors
  - The overall **nett-rating** for both the construction and operational phases are moderately-negative before mitigation and low-negative after mitigation, while the nett-rating for the decommissioning phase remains moderately-negative. A moderate **positive** impact is expected on the economic development during the construction and operational phases.
- Safety and security
  - Related activities which may have negative impacts on safety and security include an increase in social tension from the employment of outsiders, illegal business practices such as drug-dealing,
  - The overall **nett-rating** for the construction phase is moderately-negative before mitigation and low-negative after mitigation. For the operational phase it is moderately-negative before mitigation and although the rating is lower after mitigation, it remains moderately-negative. The nett-rating for the decommissioning phase is low to moderately-negative.
- Lifestyle
  - Related activities associated with lifestyle impacts an influx of – especially young people; increased trucking traffic; an increase in disposable income.
  - Although positive impacts may also result from increased income, negative impacts include an increased potential for increased substance abuse; sexually transmitted diseases (putting additional strain on the health system); and unhealthy lifestyles resulting in an increase in non-communicable diseases.



- The overall nett-rating for the construction phase is moderately-negative before mitigation and low-negative after mitigation. For the operational phase it is moderately-negative before mitigation and although the rating is lower after mitigation, it remains moderately-negative. The nett-rating for the decommissioning phase is low-negative.
- Physical infrastructure
  - Related activities include again the influx of people, increased traffic loads,.
  - Associated impacts on the physical infrastructure include road deterioration, additional burden on the housing, school, water, sanitation, and electricity infrastructure which already experiences a backlog.
  - The nett-impact rating for this Environmental Health Area is high to moderately-negative before mitigation and after mitigation, moderate to low-negative for construction, and moderate negative for the operational and decommissioning phases.
- Health Management and Infrastructure
  - The main activity of concern again relates to the influx of people, especially those without medical aid. The reliance of the health infrastructure on mobile clinics, combined with an understaffed district hospital will increase the burden on clinics.
  - The nett-impact rating on health services, infrastructure and capacity before mitigation is moderately-negative during both the construction and operational phases. After mitigation the impact decreases to low-negative during construction but remains moderately-negative during the operational phase.
- Food and nutrition
  - Related activities of include the influx of people which will result in an increased demand for food. Unhygienic food practices will increase food-borne illnesses with diarrhoeal disease already being the main cause of death amongst those below 15 years of age. Increased disposal income may contribute to reducing food security and malnutrition but (specifically during the operational phase) for the unskilled and unemployed, food security may increase.
  - The nett impact rating before mitigation for each of the phases is moderately-negative and low-negative after mitigation for the construction and decommissioning phases. For the operational phase the net-rating remains moderately-negative after mitigation. There is also a possible moderate positive impact in the affordability of food during the operational phase.
- Environmental pollution
  - Activities during all three phases will result in the emissions of particulate matter (dust). Although modelled concentrations were only predicted to exceed the standards on site, it must be kept in mind that there are people residing within the site boundaries near the haul road (RES, 2016) and it must be kept in mind that air pollution has no boundaries and small particles may travel far. Mitigation measures are therefore required.
  - Indoor air pollution levels are not currently known. If more people enter the area, informal housing and thus the use of domestic fuels for cooking and heating, are likely to increase.



- Noise levels will be affected to various extents during the three phases. Noise, especially during blasting, during the construction and operation phase in the southern section of the Tubatse mining village may warrant the need for noise barriers.
- Water-related activities include dewatering due to groundwater inflow into the open mine pit, which is not foreseen when the Klarinet and Tubatse koppies will be mined, but when the Spitskop flats are mined, inflow of groundwater is predicted.
- The nett-impact for environmental pollution during construction is moderate-negative before and low-negative after mitigation. During the operational phase the nett-impact is moderately-negative (domestic and operational activities) to high-negative (vehicle emissions and noise). The nett-impact for the decommissioning phase is moderate-negative before mitigation and low-negative after mitigation.

As part of the Human Health assessment carried out by an independent consultant, a Spitsvale Health Action plan was developed.

The detailed Human Health Impact assessment report with the Spitsvale action plan is attached as **Appendix Q**.



## XI. Socio-economic

A detailed desktop background study on the socio-economic impact of the proposed activity are provided in Section 3 of the Final Submitted social and Labour Plan dated September 2015 compiled by BCR Minerals (Pty) Ltd (find **Appendix F**). The data for the Greater Tubatse Municipality used for this study are based on the latest IDP data for each municipality and data from the 2014/2015 Census as contained in the Municipal Demarcation Board's website, as well as data from the GTM IDP document.

The following socio-economic impacts associated to the proposed activity have been identified in this study:

- **Job Creation, employees and their households:** Spitsvale will employ approximately 60 people (permanent and the Core Contactor), which translate into many more individuals being impacted through direct and indirect income from bread winner support. These employees and their households are impacted positively from salaries and other employment benefits. Considering that Spitsvale has an expected mining life in excess of 20 years, these benefits should be sustainable into the short to long-term future. In order to ensure that these constructive impacts do not become destructive upon closure, it is important for Spitsvale to plan towards their eventual closing and to put mitigating measures in place. These will assist their employees to find alternative sources of income outside of Spitsvale and mining.
- **Surrounding and labour sending communities:** As noted, Spitsvale's workforce will come mainly from the local community, but these people may be representative of other labour sending areas. The future incomes earned by these employees will translate into spending power, benefiting businesses and entrepreneurs not only in the area surrounding the operation where the employees spend their working week, but also in those economies further away. Spitsvale's spending on goods and services can also contribute significantly to the local economy (refer to Procurement Section 3.6).
- **Poverty eradication:** Besides the positive impact the Spitsvale Mine can have on the livelihoods of the households of its future employees in the neighbouring and labour sending communities, Spitsvale will contribute to the upliftment of the local communities surrounding the operation. In addition to a contribution of the economy, Spitsvale will also pay significant amounts in annual taxes, which will be used by the Government. One of the many uses of taxes is for the distribution of wealth, which alleviates poverty within the poorer communities.

BCR Minerals (Pty) Ltd has identified a number of preliminary Local Economic Development (LED) projects and will undertake feasibility studies on these projects in consultation with the Community Committee Forums and Greater Tubatse Municipality to ensure that these LED projects are acceptable.



## XII. Heritage

In accordance with Section 38 of the National Heritage Resources Act, No 25 of 1999 (NHRA), an independent heritage consultant was appointed by the EAP to conduct a cultural heritage assessment to determine if the mining activities would have an impact on any sites, features or objects of cultural heritage significance.

A number of sites were identified and can be summarised as follows (see Appendix 5 for more detail on each identified site):

- Stone tools were found to occur as low density surface scatter in erosion gullies. As the density of artefacts is very low, no further action is required.
- A total of five old homestead sites were identified in the proposed mining area and it is anticipated that it would be impacted on by the mining activities.
- A total of nine informal burial places were identified. All are located inside of or in close proximity to the mining area and it is anticipated that it would be impacted on by the mining activities.
- A single site defined as of industrial/infrastructural heritage was identified.

The appointed heritage consultant recommended the following conditions to be included in the environmental authorisation:

- It is recommended that the homestead sites are retained, and that it should be fenced off for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the stone walling/physical features. If the sites cannot be retained, it should be documented (mapped and excavated) by an archaeologist after obtaining a permit from SAHRA (see Appendix 5 for more detail the proposed mitigation for each identified site). If mining takes place in these areas, the community should be consulted to determine if there are any more graves in the region, especially those of young children who, in many cases, are buried inside the old homestead.
- It is recommended that the burial sites are retained and it should be fenced off for the duration of the mining activities, leaving a buffer zone of at least five metres from the outer edge of the graves. If the graves cannot be retained, it should be relocated, but only on condition of following the correct procedures (see Appendix 5 of the attached Heritage Impact Assessment).
- It is recommended that the industrial/infrastructural heritage feature (irrigation system) should be documented (photographed and mapped) in before mining activities takes place.
- Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. According to local inhabitant, Mr Silas Mosethla, old informal burial sites might still be located in some places, but it would be difficult to trace due to "lack of memory" and the current dense vegetation.

The detailed Heritage Impact assessment report is attached as **Appendix R**.



### **XIII. Traffic Assessment**

A Traffic Impact Assessor was appointed by the EAP to investigate the potential impacts the proposed activities would have on the current transportation infrastructure. This assessment was carried out in accordance with the *Manual of Traffic Impact Studies* published by the *Committee of Transport Officials (COTO), 2014*. The operation of the mine will be based east of the D1261 Road and will be accessed from the existing access road on the D1261 Road.

The purpose of this report is to provide findings of the traffic impact investigation conducted to assess the impact of the proposed Chrome mine operations on the existing external road network surrounding the development area. Based on this assessment, mitigation measures are recommended to minimise the potential impact on the existing road network.

The following tasks have been carried out as part of the traffic impact investigation:

- Determination of the trip generation due to the proposed Chrome mine operations activities;
- Assessing the impact of the trips generated by the mine on the road network (capacity analysis of the affected routes including the intersection analysis);
- Safety Statement: an assessment of the access position and safety in terms of geometrical standards and street lighting at sufficient standards;
- Public transport provision for the mine employees; and
- A detailed proposal of site specific mitigations, if and where applicable.

The main phases of the project have been identified as follows: construction phase (2014 to 2016), operational phase (2016 to 2045) and closure and decommissioning phase (2046). The critical impact in terms of the traffic generated is expected to be during the operational phase.

The findings of this investigation can be summarised as follows:

- All the analysed roads are paved and are in a fair condition .i.e the R555, R557 and the D1261.
- The existing access road does not have a traffic sign control but is treated as a two way priority controlled intersection, with priority on the D1261. It is expected that the access intersection will operate at an acceptable Level of Service (LOS) when the proposed development is fully operational, but exclusive turning lanes are proposed for safety purposes. It is further proposed that the access road be paved for at least 400m to prevent weathering of the D1261 as it is currently a gravel road.
- Three phases were analysed and it was determined that the operational phase is the critical one, since it generates the highest volume of additional trips. The trips generated during this phase was estimated at 76 vehicle trips per day and 41 vehicle trips per hour during both the AM and PM peak hours. Therefore the Operational phase was then further analysed to determine the impact that the proposed mine will have on the surrounding road network.
- Four scenarios were analysed, all the intersections operate at an acceptable level of service except for the R555 / D1261 intersection, during the third scenario, where the 2027 background traffic, Latent Rights and the



development traffic volumes are combined. The failure in operation of the intersection is caused by the background traffic not the development traffic. It is proposed that the four way stop controlled intersection be converted to a two way priority stop control intersection with priority on the R555.

- In order to ensure pedestrian safety: the mine will make provision for public transport for their staff. It is therefore proposed that there be no on-street pick up / drop offs at the D1261 / Access road to the proposed mine (drop-offs / pickup should be done on site).
- For safety reasons it is proposed that there be provision of sufficient street lighting in the vicinity of the access intersection.
- Parking provision should be made for trucks to prevent queuing on the national roads and the D1261.
- All of the above mitigation measures should be in place before or in the first to second year of the operational phase.

The detailed Traffic assessment report is attached as **Appendix S**.



#### **XIV. Waste Classification**

A classification procedure was performed according to the National Environmental Management Act: Waste Act, 2008 (Act No.59 of 2008): National Norms and Standards for the Assessment of Waste for Land Disposal, as published in the Government Gazette No. 36784, dated August 2013.

The basis of the norms and standards is to define a pollution control barrier system for the waste to be disposed of. The approach was as follows:

- Identification of chemical substances present in the waste.
- Sampling and analyses to determine the total concentrations (TC) and leachable concentrations (LC) for the elements and chemical substances identified in the waste.
- The TC and LC limits of the chemical substances in the waste must be compared to the threshold limits for total concentration (TCT limits) and leachable concentrations (LCT limits) of the specific elements and chemical substances.
- Based on the TC and LC limits of the elements and chemical substances in the waste exceeding the corresponding TCT and LCT limits, respectively, the specific type of waste for disposal to land must be determined.

The residue deposits recorded alkaline pH and low to undetected levels of soluble (mobile) macro- and micro constituents. Given the nature and mineralogy of the Bushveld Complex, the total concentration analyses did reveal some micro constituents to be above detection levels whilst also exceeding TCT0 levels with regards to the Norms and Standards. Micro-elements that exceeded the TCT0 levels include cobalt, copper, manganese, nickel, vanadium and fluoride.

If the Norms and Standards methodology is strictly applied to the WRDs, it can neither be classed as Type 3 or a Type 4 waste material. According to the methodology, for a waste material to be classified as Type 4, the LC (leachable concentration) and the TC (total concentration) must be below the LCT0 and TCT0, while for a waste to be classified as Type 3, the LC and TC must be below the LCT1 and TCT1, respectively. However, the following is true for the waste rock:

$$(LC < LCT0 \text{ and } TCT0 < TC < TCT1)$$

Strictly in terms of the National Norms and Standards for Disposal of Waste to Landfill (Government Notice R636), which is also applicable to MRSRDs, the containment barriers for the WRDs must comply with the minimum engineering design requirements of a Class C Landfill or Class D Landfill as shown below.



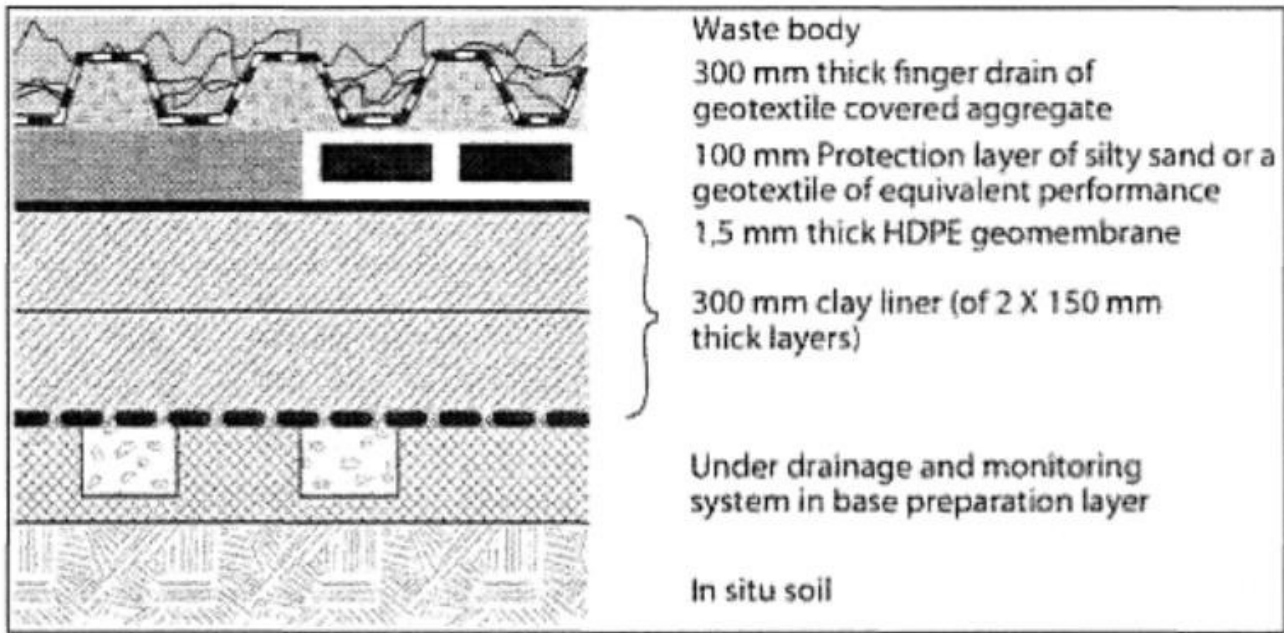


Figure 8: Class C Landfill engineering design

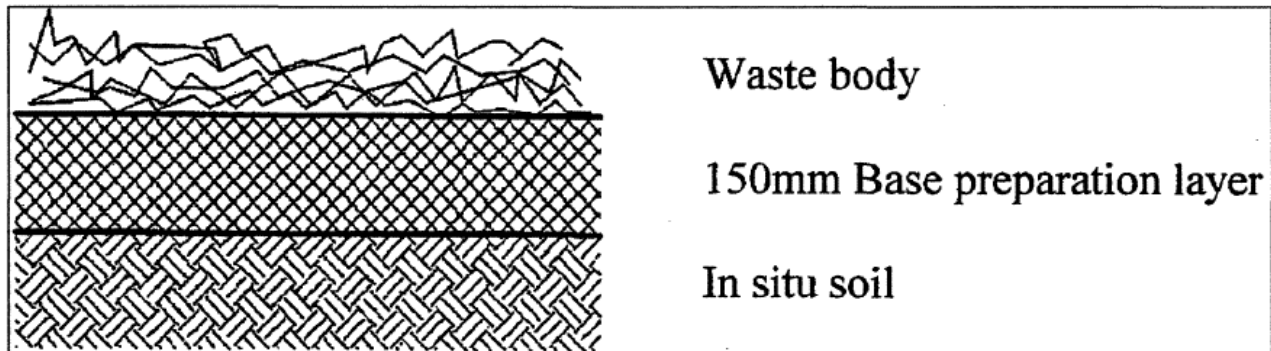


Figure 9 :Class D Landfill engineering design

The BCR WRDs recorded within LCT0 limits, and this together with the fact that the material is non-acid generating, the risk of poor quality leachate developing from the WRDs towards the receiving environment is perceived to be very low. A Class D Landfill Engineering Design is therefore proposed.

A copy of the Waste Classification Report is attached as **Appendix V**.



**(b) Description of current land uses**

Land capability classification shows the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

*Table 7: Criteria for Determination of Land Capability*

<b>Summarised Description Of Land Capability Criteria</b>	
<b>Wetlands, Pans, Drainage Lines</b>	Land with organic soils or supporting hygrophilous vegetation where soil and vegetation processes are water determined.
<b>Arable</b> (>600mm)	Land that does not qualify as wetland. Soil is readily permeable to depth of 750mm. Soil has pH value between 4 and 8.4. Soil has low salinity and SAR. Soil has less than 10% (by volume) rocks or pedocrete fragments larger than 100mm in the upper 750mm. Has a slope (%) and erodibility factor (k) such that their product is <2.0. Occurs under a climate of crop yields that are at least equal to the current national average for these crops.
<b>Grazing</b> (250 – 600mm)	Land which does not qualify as wetland or arable land. Has soil, or soil-like material, permeable to roots of native plants, that is more than 250mm thick and contains less than 50% by volume of rocks or pedocrete fragments larger than 100mm. Supports, or is capable of supporting a stand of native or introduced grass species or other forage plants used by domesticated livestock or game animals on a commercial basis.
<b>Wilderness</b> (<250mm)	Land which does not qualify as wetland, arable or grazing land.

Table 8 summarises the **land use** of the area investigated. Find **Appendix H.2** for the land use map.

*Table 8: Land use*

<b>Area</b>	<b>Land Use</b>	<b>Surface Area (ha)</b>	<b>% of Total</b>
Portions 8, 22 Farm Kennedy's Vale 361KT & Portions 24, 25, 26 and 28 Farm Spitskop 333KT	Mining & Industrial	97	4,48
	Natural Veld	1,899	87,69
	Ploughed Land	81	3,75
	Settlement	75	3,46
	Wetlands	14	0,62
	<b>Total</b>		<b>2,166</b>



Table 9 summarises the **land capability** of the area investigated. Find **Appendix H.3** for the land capability map.

*Table 9: Land capability*

Area	Land Capability	Surface Area (ha)	% of Total
Portions 8, 22 Farm Kennedy's Vale 361KT & Portions 24, 25, 26 and 28 Farm Spitskop 333KT	Arable	377	17,42
	Wilderness	1,649	76,14
	Wetland	14	0,62
	Settlement	75	3,46
	Mining & Industrial	51	2,36
	<b>Total</b>	<b>2,166</b>	<b>100</b>

The information provided in this section is derived from the site specific soil assessment conducted. The detailed investigation report is attached as **Appendix O**.

**(c) Description of specific environmental features and infrastructure on site**

Throughout the process of determination the potential environmental impacts, the site layout for the proposed activities were considered.

Infrastructure associated to the proposed Spitsvale Mine are as follows:

- Access roads;
- River crossings;
- Storm water management infrastructure i.e. storm water channels;
- A way bridge;
- Site offices (permanent and temporary);
- Onsite clinic facility;
- Workshops and stores;
- Ablution facilities;
- Mobile sewage treatment facility;
- Sedimentation Ponds (pollution containment ponds);
- Bulk diesel storage facility;
- Temporary hazardous substance stores;
- RoM and product stockpile lay down areas;
- Screening lay down areas;
- Vehicle/Equipment/Plant parking bay;
- Boreholes;



Apart from the infrastructure associated to the mining development, a number of environmentally and socially sensitive receptors were identified. **Appendix H.1** provides the detailed site lay out plan in relation to the sensitive receptors.

**(d) Environmental and current land use map**

*(Show all environmental and current land use features)*

Find **Appendix H.2**.

**v) Environmental impacts and risks**

*(Include the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts. 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. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated)*

This section summarises the potential impacts associated to the three different phases of the proposed mining activities. The potential impacts and risks are explored by investigating each aspect (i.e. air quality, soil quality, water quality etc.) associated with the proposed activities.

For the purpose of this section, the mitigation measures recommended will only summarise the approach taken to manage each risk. A detailed mitigation plan will form part of Part B of this report.

*Table 10: Explanation of colour indicator*

Colour	Significance Points	Explanation
	≤ 30	<b>LOW</b> environmental significance
	31 - 60	<b>MODERATE</b> environmental significance
	> 60	<b>HIGH</b> environmental significance



Table 11: Summary of identified potential impacts and aspects associated to the Waste Management Activities

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	DESCRIPTION OF ENVIRONMENTAL RISK (Direct and indirect impact)	PHASE	Duration	Extent	Magnitude	Probability	SIGNIFICANCE (Pre-Mitigation)	MITIGATION CONSIDERATIONS Mitigation Type	Duration	Extent	Magnitude	Probability	SIGNIFICANCE (Post-Mitigation)
<b>Infrastructure Development</b>															
<i>Air Quality</i>															
1. Access and hauling along roads i.e. during the construction of roads	Dust generation	Air Quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Site clearing and Infrastructure construction involves the removal of rock and earth by grading or digging during construction.</li> <li>Vegetation is removed, grading and paving takes place using a range of road construction equipment.</li> <li>Continuous use of haul road often leads to the generation of fugitive dust</li> <li>The activities listed above often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the respiratory function of plants</li> <li>Complaints from the community of respiratory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> <li>flora recruitment will slow down as the vegetation will be stress with blocked pores</li> </ul>	Construction & Operational	1	2	6	5	45	Control	1	1	4	3	18
2. Site clearing and topsoil stripping				Construction	1	2	6	5	45	Control	1	1	6	4	32
5. Mining offices i.e. operation of training centres, offices and kitchen facilities				Construction	1	1	6	5	40	Control	1	1	6	3	24
8. Sedimentation Ponds i.e. Construction and operation				Construction	1	1	4	5	30	Control	1	1	2	3	12
15. Transport of construction material, mobile plant and equipment to the site				Construction & Operational	1	1	6	5	40	Control	1	1	6	3	24



1. Access and hauling along roads i.e. during the construction of roads	CO <sub>2</sub> emissions	Air Quality	<u>Direct/Indirect/Cumulative Impact:</u> <ul style="list-style-type: none"> <li>The use of diesel operated construction equipment will cause a contributing factor the BCR Minerals (Pty) Ltd carbon footprint.</li> </ul>	Construction & Operational	1	3	6	5	50	Control	1	1	2	3	12
2. Site clearing and topsoil stripping					3	3	6	4	48		1	1	2	3	12
9.Stores, workshops & wash bays					4	1	4	5	45		4	1	4	3	27
11. Fuel operating power generators					4	1	4	5	45		4	1	4	3	
15. Transport of construction material, mobile plant and equipment to the site					1	1	4	5	30		1	1	2	5	20
4. Onsite Clinic	Electricity usage	CO <sub>2</sub> emissions	<u>Direct/Indirect/Cumulative Impact:</u> <ul style="list-style-type: none"> <li>Contributing factor to the BCR Minerals (Pty) Ltd carbon footprint.</li> </ul>	Operational	4	2	4	5	50	Control	4	1	2	3	21
5. Mining offices i.e. operation of training centres, offices and kitchen facilities				Operational	3	1	4	5	40	Control	4	1	2	3	21
12. Lighting				Construction & Operational	4	1	4	5	45	Control	4	1	2	3	21



13. Fuel storage	Emission of noxious fumes	Air Quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Evaporation of diesel fuel and heavy fuel from temporary tanks and possible spills during loading of fuel from tanks on site that are used for re-fuelling of heavy machinery and trucks may lead to the development of respiratory problems and irritation to eyes.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Headaches and irritation to eyes.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Repertory and long term health impacts</li> </ul>	Construction & Operational	4	1	8	5	65	Avoid	4	1	6	3	33
<b>Human Health and Safety</b>															
1. Access and hauling along roads i.e. during the construction of roads	Dust generation	Human Health	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Site clearing and Infrastructure construction involves the removal of rock and earth by grading or digging during construction.</li> <li>Vegetation is removed, grading and paving takes place using a range of road construction equipment.</li> <li>Continuous use of haul road often leads to the generation of fugitive dust</li> <li>The activities listed above often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads.</li> </ul>	Construction & Operational	2	1	6	5	45	Control	1	1	4	3	18
15. Transport of construction material, mobile plant and equipment to the site			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the repertory function of plants</li> <li>Complaints from the community of repertory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> </ul>		1	1	8	5	50		1	1	6	3	24



4. Onsite Clinic	Medical Waste generation	Human Health	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of medical waste generated during the construction and operational phase poses a high risk to human health.</li> </ul>	Construction & Operational	3	2	6	4	44	Control	4	1	4	3	27	
8. Sedimentation Ponds i.e. Construction and operation	Smell nuisance	Human health and safety environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Lack of maintenance and treatment may result in a smelling environment</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Fumes from hazardous substances could cause nausea or headaches.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>May lead to a potential nuisance to local communities and land users in close proximity to the authorised site.</li> </ul>	Construction & Operational	4	1	6	5	55	Avoid	1	2	6	3	27	
10. Ablutions & change house with sewage treatment plant																4
9. Stores, workshops & wash bays	Chemical Fires	Human health and safety environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The improper storage of hazardous substances poses a risk of chemical fires. In the event of a chemical fire the impact to the surrounding environment is significant.</li> <li>If humans are exposed to the fire it will cause damage to their skin and limbs.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of finances and assets of people or companies that have had their valuables burned,</li> <li>Damage to human health and potentially death (long term and short term)</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Loss of lives, loss of ecosystems and increase of poverty of people who have lost valuables in the fire.</li> </ul>	Construction & Operational	1	1	1	0	4	48	Avoid	1	1	10	2	24
11. Fuel operating power generators				Construction & Operational	1	2	1	0	5	65	Avoid	1	1	10	2	24
13. Fuel storage				Construction & Operational	1	2	1	0	5	65	Avoid	1	1	10	2	24





14. Employment of workers and procurement of construction materials.	Health and Safety of employees	Human health and safety environment	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Increased demand for labour and employees from different cultures may pose a risk to the lack of knowledge and skills on health and safety in the work place.</li> <li>Different human behaviours addresses different situations and;</li> <li>If there is not a simplified system of managing health and safety risk loss or injury of human life may be the result.</li> </ul>	Construction & Operational	4	1	6	5	55	Control	4	1	6	3	33
<b>Topography and Visual Environment</b>															
1. Access and hauling along roads i.e. during the construction of roads	Dust generation	Topography and Visual Environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Site clearing and Infrastructure construction involves the removal of rock and earth by grading or digging during construction.</li> <li>Vegetation is removed, grading and paving takes place using a range of road construction equipment.</li> <li>Continuous use of haul road often leads to the generation of fugitive dust</li> <li>The activities listed above often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the repertory function of plants</li> <li>Complaints from the community of repertory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> <li>flora recruitment will slow down as the vegetation will be stress with blocked pores</li> </ul>	Construction & Operational	1	1	6	5	40	Control	1	2	6	3	27
2. Site clearing and topsoil stripping				Construction	3	2	6	5	55		1	1	6	4	32
15. Transport of construction material, mobile plant and equipment to the site				Construction & Operational	3	1	6	5	50		1	1	6	3	24



<p><b>2. Site clearing and topsoil stripping</b></p>	<p>Topography and visual alteration</p>	<p>Topography and Visual Environment</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Vegetation stripping during site clearing and topsoil removal activities will alter the visual environment and topography and feature a scarring on the landscape.</li> </ul>	<p>Construction</p>	<p>3</p>	<p>2</p>	<p>6</p>	<p>5</p>	<p>55</p>	<p><b>Remedy</b></p>	<p>1</p>	<p>2</p>	<p>6</p>	<p>4</p>	<p>36</p>
<p><b>5. Mining offices i.e. operation of training centres, offices and kitchen facilities</b></p>	<p>Topography and visual alteration</p>	<p>Topography and Visual Environment</p>	<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Related to the sense of place being disturbed.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Permanent change to the visual environment and the topography</li> </ul>	<p>Construction</p>	<p>4</p>	<p>1</p>	<p>6</p>	<p>5</p>	<p>55</p>	<p><b>Remedy</b></p>	<p>2</p>	<p>1</p>	<p>4</p>	<p>3</p>	<p>21</p>
<p><b>5. Mining offices i.e. operation of training centres, offices and kitchen facilities</b></p>	<p>General waste generation &amp; Littering</p>	<p>Visual Environment</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Littering throughout the construction and operational phase poses the risk of the visual environment to be effected negatively.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Related to the sense of place being disturbed.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Permanent change to the visual environment and the topography</li> </ul>	<p>Construction &amp; Operational</p>	<p>3</p>	<p>2</p>	<p>6</p>	<p>5</p>	<p>55</p>	<p><b>Control</b></p>	<p>4</p>	<p>1</p>	<p>4</p>	<p>4</p>	<p>36</p>



**Surface Water Quality**

Surface Water Quality															
1. Access and hauling along roads i.e. during the construction of roads	Hydrocarbon Contamination	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>	Construction & Operational	Control	1	1	6	4	32	1	1	6	3	24
2. Site clearing and topsoil stripping						3	1	6	5	50	1	1	6	4	32
3. Weigh bridge						4	1	6	5	55	1	1	4	2	12
6. Storm water runoff management features						4	2	8	5	70	2	1	6	2	18
8. Sedimentation Ponds i.e. Construction and operation						4	1	6	5	55	4	1	2	3	21
9. Stores, workshops & wash bays						4	2	8	5	70	4	1	6	3	33
11. Fuel operating power generators						4	2	8	5	70	4	1	6	3	33
13. Fuel storage						4	2	8	5	70	4	1	6	3	33
15. Transport of construction material, mobile plant and equipment to the site						1	1	8	5	50	1	1	4	3	18
16. Use of existing drilled / new boreholes						1	2	6	5	45	4	1	4	3	27



1. Access and hauling along roads i.e. during the construction of roads	Sedimentation and siltation of watercourses	Surface Water	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>	Construction & Operational	2	1	6	5	45	Control	2	1	6	4	36
2. Site clearing and topsoil stripping					3	2	6	5	55		1	1	6	4	32
6. Storm water runoff management features					4	2	8	5	70		4	2	6	3	36
15. Transport of construction material, mobile plant and equipment to the site					2	2	8	5	60		1	1	6	3	24
1. Access and hauling along roads i.e. during the construction of roads	Alteration of drainage patterns	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The construction of access roads through drainage lines may lead to the siltation of streams as well as lead to erosion along the river banks that will affect the surface water quality negatively.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Damage to the aquatic ecosystem and surface quality, possible extinction.</li> </ul>	Construction & Operational	2	2	6	5	50	Remedy	1	1	6	3	24
2. Site clearing and topsoil stripping					4	2	6	5	60		4	2	6	3	36
6. Storm water runoff management features					4	2	6	5	60		4	1	6	3	33



1. Access and hauling along roads i.e. during the construction of roads	Destruction of upstream tributaries and reduction in water in the catchment	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The destruction of tributaries may lead to a limited volume of water available to the downstream users.</li> <li>The reduction in water in the catchment may cause the degradation of surface water quality.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of aquatic species</li> </ul>	Construction & Operational	2	2	6	4	40	Remedy	1	1	6	3	24
2. Site clearing and topsoil stripping	Water level reduction and contamination	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The reduction in water levels as well as contamination of the water resource that may be caused by alternating the topography during site clearing and topsoil stripping poses a risk to affecting the surface and sub-surface water quality as well as the downstream users.</li> <li>Improper management of boreholes i.e. Pumping rates exceeding yield thresholds poses a risk to boreholes being pumped dry.</li> </ul>	Construction & Operational	2	1	6	5	45	Control	1	1	6	3	24
16. Use of existing drilled / new boreholes			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>		4	2	6	5	60		4	2	2	3	24
5. Mining offices i.e. operation of training centres, offices and kitchen facilities	General waste generation & Littering	Surface Water quality due to leachates	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Littering throughout the construction and operational phase poses the risk of the visual environment to be effected negatively.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>The storing of waste onsite for an extended time may cause the formation of leachate that will affect the soil and water quality of the surrounding environment in a negative way.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposure of leachate to the natural environment poses a health risk to the surrounding fauna and flora habitats as well as human health.</li> </ul>	Construction & Operational	2	1	6	3	27	Control	4	1	2	4	28



8. Sedimentation Ponds i.e. Construction and operation	Contamination of water resources	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>In the event that Sedimentation Ponds are not constructed in a way to avoid seepage to the surrounding environment or if not maintained, it poses a risk of contaminating water resources within close proximity to the facility.</li> <li>Improper management of effluent from store, workshops, and wash bays poses a high risk to contaminating water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> </ul>	Construction & Operational	5	2	8	5	75	Avoid	1	1	6	2	16
9. Stores, workshops & wash bays					4	2	8	5	70		4	1	6	3	33
10. Ablutions & change house with sewage treatment plant					4	2	8	5	70		4	1	6	3	33
11. Fuel operating power generators					4	2	8	5	70		4	1	6	3	33
13. Fuel storage					4	2	8	5	70		4	1	6	3	33



**Ground water Quality**

Ground water Quality															
1. Access and hauling along roads i.e. during the construction of roads	Hydrocarbon Contamination	Groundwater quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>	Construction & Operational	Control	1	2	6	3	27	1	2	6	2	18
2. Site clearing and topsoil stripping						2	1	6	4	36	1	1	6	3	24
3. Weigh bridge						3	1	4	3	24	1	1	4	2	12
6. Storm water runoff management features						4	2	8	4	56	2	1	4	2	14
8. Sedimentation Ponds i.e. Construction and operation						4	1	6	3	33	4	1	6	1	11
9. Stores, workshops & wash bays						4	2	8	5	70	4	1	6	2	22
11. Fuel operating power generators						4	2	8	5	70	4	1	6	2	22
13. Fuel storage						4	2	8	5	70	4	1	6	2	22
15. Transport of construction material, mobile plant and equipment to the site						1	1	8	5	50	1	1	4	2	12
16. Use of existing drilled / new boreholes						1	2	6	5	45	4	1	4	2	18



2. Site clearing and topsoil stripping	Water level reduction and contamination	Groundwater quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The reduction in water levels as well as contamination of the water resource that may be caused by alternating the topography during site clearing and topsoil stripping poses a risk to affecting the surface and sub-surface water quality as well as the downstream users.</li> <li>Improper management of boreholes i.e. Pumping rates exceeding yield thresholds poses a risk to boreholes being pumped dry.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>	Construction & Operational	2	1	6	5	45	Control	1	1	6	3	24
16. Use of existing drilled / new boreholes					4	2	6	5	60		4	1	4	3	27
8. Sedimentation Ponds i.e. Construction and operation	Contamination of water resources	Groundwater quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>In the event that Sedimentation Ponds are not constructed in a way to avoid seepage to the surrounding environment or if not maintained, it poses a risk of contaminating water resources within close proximity to the facility.</li> <li>Improper management of effluent from store, workshops, and wash bays poses a high risk to contaminating water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> </ul>	Construction & Operational	5	2	8	5	75	Avoid	1	1	6	2	16
9. Stores, workshops & wash bays					4	2	8	5	70		4	1	6	2	22
10. Ablutions & change house with sewage treatment plant					4	2	8	4	56		4	1	6	2	22
11. Fuel operating power generators					4	2	8	4	56		4	1	6	2	22
13. Fuel storage					4	2	8	4	56		4	1	6	2	22





**Wetlands and Aquatic Ecology**

Activity	Impact	Receptor	Impact Description	Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1. Access and hauling along roads i.e. during the construction of roads						2	1	6	5	45							2	1	6	3	27
2. Site clearing and topsoil stripping			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> </ul>			3	1	6	5	50							1	1	6	4	32
6. Storm water runoff management features	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul>	Construction & Operational		4	2	8	5	70							4	2	6	3	36
15. Transport of construction material, mobile plant and equipment to the site			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>			2	2	8	5	60							1	1	6	3	24



1. Access and hauling along roads i.e. during the construction of roads	Alteration of drainage patterns	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The construction of access roads through drainage lines may lead to the siltation of streams as well as lead to erosion along the river banks that will affect the surface water quality negatively.</li> </ul>	Construction & Operational	2	2	6	5	50	Remedy	1	1	4	3	18
2. Site clearing and topsoil stripping			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul>		4	2	6	5	60		4	2	6	3	36
6. Storm water runoff management features			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Damage to the aquatic ecosystem and surface quality, possible extinction.</li> </ul>		4	2	8	5	70		4	1	6	3	33
1. Access and hauling along roads i.e. during the construction of roads	Destruction of upstream tributaries and reduction in water in the catchment	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The destruction of tributaries may lead to a limited volume of water available to the downstream users.</li> <li>The reduction in water in the catchment may cause the degradation of surface water quality.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of aquatic species</li> </ul>	Construction & Operational	3	2	6	3	33	Remedy	1	1	6	3	24
2. Site clearing and topsoil stripping	Destruction of Wetlands	Wetlands and Aquatic Ecology	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Site clearing and topsoil stripping in Wetlands will cause the loss of micro and macro aquatic species.</li> </ul>	Construction & Operational	3	2	8	5	65	Avoid	2	1	6	4	36



8. Sedimentation Ponds i.e. Construction and operation					5	2	8	4	60		1	1	6	2	16
10. Ablutions & change house with sewage treatment plant	Contamination of water resources	Wetlands and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>In the event that Sedimentation Ponds are not constructed in a way to avoid seepage to the surrounding environment or if not maintained, it poses a risk of contaminating water resources within close proximity to the facility.</li> <li>Improper management of effluent from store, workshops, and wash bays poses a high risk to contaminating water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> </ul>	Construction & Operational	4	2	8	5	70	Avoid	4	1	6	3	33
11. Fuel operating power generators			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> </ul>		4	2	8	5	70		4	1	6	3	33
13. Fuel storage			4		2	8	5	70	4		1	6	3	33	



**Water Resource Users and Management**

<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p>Destruction of upstream tributaries and reduction in water in the catchment</p>	<p>Downstream water users</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The destruction of tributaries may lead to a limited volume of water available to the downstream users.</li> <li>The reduction in water in the catchment may cause the degradation of surface water quality.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of aquatic species</li> </ul>	<p>Construction &amp; Operational</p>	<p>3</p>	<p>2</p>	<p>6</p>	<p>4</p>	<p>44</p>	<p><b>Remedy</b></p>	<p>1</p>	<p>1</p>	<p>6</p>	<p>3</p>	<p>24</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p>Water usage for dust suppression</p>	<p>Wastage of water resource</p>	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of the water used during dust suppression may lead to the wastage of the available water resource</li> </ul>	<p>Construction &amp; Operational</p>	<p>1</p>	<p>2</p>	<p>4</p>	<p>5</p>	<p>35</p>	<p><b>Modify</b></p>	<p>1</p>	<p>1</p>	<p>4</p>	<p>3</p>	<p>18</p>
<p><b>2. Site clearing and topsoil stripping</b></p>	<p>Water level reduction and contamination</p>	<p>Downstream water users</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The reduction in water levels as well as contamination of the water resource that may be caused by alternating the topography during site clearing and topsoil stripping poses a risk to affecting the surface and sub-surface water quality as well as the downstream users.</li> <li>Improper management of boreholes i.e. Pumping rates exceeding yield thresholds poses a risk to boreholes being pumped dry.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>	<p>Construction &amp; Operational Construction &amp; Operational</p>	<p>2</p>	<p>2</p>	<p>6</p>	<p>5</p>	<p>50</p>	<p><b>Remedy</b></p>	<p>1</p>	<p>1</p>	<p>6</p>	<p>3</p>	<p>24</p>
<p><b>16. Use of existing drilled / new boreholes</b></p>	<p>Water level reduction and contamination</p>	<p>Downstream water users</p>	<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>	<p>Construction &amp; Operational Construction &amp; Operational</p>	<p>4</p>	<p>2</p>	<p>6</p>	<p>5</p>	<p>60</p>	<p><b>Control</b></p>	<p>4</p>	<p>1</p>	<p>4</p>	<p>3</p>	<p>27</p>



4. Onsite Clinic	Domestic water usage	Wastage of water resource	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>The lack of water management and maintenance of taps, toilets, basins etc. poses a risk to wastage of water.</li> </ul>	Operational	3	1	2	5	30	Avoid	4	1	2	3	21
5. Mining offices i.e. operation of training centres, offices and kitchen facilities					3	1	4	5	40		4	1	2	3	21
7. Water storage facilities	Improper water storage management	Wastage of water resource	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of effluent from fuel and sediment may cause contamination of water resources through surface water pollution and with the contaminants seeping into the soil the ground water will also be polluted as a result.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats and effect the surface and sub-surface water quality.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> </ul>	Operational	4	1	6	4	44	Control	4	1	2	3	21
		Water contamination			4	1	8	4	52		1	1	6	2	16



**Soil Quality**

Soil Quality															
1. Access and hauling along roads i.e. during the construction of roads	Hydrocarbon Contamination	Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>	Construction & Operational	Control	2	1	6	4	36	1	1	6	3	24
2. Site clearing and topsoil stripping						2	1	6	4	36	1	1	6	3	24
3. Weigh bridge						2	1	6	4	36	1	1	6	3	24
6. Storm water runoff management features						4	2	8	5	70	2	1	6	2	18
8. Sedimentation Ponds i.e. Construction and operation						4	2	8	5	70	2	1	6	2	18
9. Stores, workshops & wash bays						4	2	8	5	70	4	1	6	3	33
11. Fuel operating power generators						4	1	6	5	55	4	1	6	3	33
13. Fuel storage						4	2	6	5	60	4	1	6	3	33
15. Transport of construction material, mobile plant and equipment to the site						1	1	8	5	50	1	1	4	3	18
16. Use of existing drilled / new boreholes						1	2	6	5	45	4	1	4	2	18



1. Access and hauling along roads i.e. during the construction of roads	Degradation of soil resources	Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Construction & Operational	1	1	6	3	24	Remedy	1	1	6	3	24
		Flora micro-ecosystems			1	1	6	3	24		1	1	6	3	24
Soil quality		2			1	6	5	45	1		1	6	3	24	
Flora micro-ecosystems		2			1	6	5	45	1		1	6	3	24	
Soil quality		4			1	6	5	55	4		1	6	3	33	
Fauna & Flora micro-ecosystems		4			1	8	5	65	4		1	6	3	33	
Soil quality		4			1	6	5	55	4		1	6	3	33	
Flora micro-ecosystems		4			1	8	5	65	4		1	6	3	33	
Soil quality		4			1	6	5	55	4		1	6	3	33	
Flora micro-ecosystems		4			1	8	5	65	4		1	6	2	33	
2. Site clearing and topsoil stripping		Degradation of soil resources			Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Construction & Operational	1	1		6	3	24	Remedy	1
Flora micro-ecosystems	1		1	6	3			24	1	1	6	3	24		
Soil quality	2		1	6	5			45	1	1	6	3	24		
Flora micro-ecosystems	2		1	6	5			45	1	1	6	3	24		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Fauna & Flora micro-ecosystems	4		1	8	5			65	4	1	6	3	33		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Flora micro-ecosystems	4		1	8	5			65	4	1	6	3	33		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Flora micro-ecosystems	4		1	8	5			65	4	1	6	2	33		
9.Stores, workshops & wash bays	Degradation of soil resources		Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Construction & Operational			1	1	6	3	24	Remedy		1
Flora micro-ecosystems		1	1			6	3	24	1	1	6	3		24	
Soil quality		2	1			6	5	45	1	1	6	3		24	
Flora micro-ecosystems		2	1			6	5	45	1	1	6	3		24	
Soil quality		4	1			6	5	55	4	1	6	3		33	
Fauna & Flora micro-ecosystems		4	1			8	5	65	4	1	6	3		33	
Soil quality		4	1			6	5	55	4	1	6	3		33	
Flora micro-ecosystems		4	1			8	5	65	4	1	6	3		33	
Soil quality		4	1			6	5	55	4	1	6	3		33	
Flora micro-ecosystems		4	1			8	5	65	4	1	6	2		33	
10. Ablutions & change house with sewage treatment plant		Degradation of soil resources	Soil quality			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Construction & Operational	1	1	6	3	24		Remedy	1
Flora micro-ecosystems	1		1	6	3			24	1	1	6	3	24		
Soil quality	2		1	6	5			45	1	1	6	3	24		
Flora micro-ecosystems	2		1	6	5			45	1	1	6	3	24		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Fauna & Flora micro-ecosystems	4		1	8	5			65	4	1	6	3	33		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Flora micro-ecosystems	4		1	8	5			65	4	1	6	3	33		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Flora micro-ecosystems	4		1	8	5			65	4	1	6	2	33		
11. Fuel operating power generators	Degradation of soil resources		Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Construction & Operational			1	1	6	3	24	Remedy		1
Flora micro-ecosystems		1	1			6	3	24	1	1	6	3		24	
Soil quality		2	1			6	5	45	1	1	6	3		24	
Flora micro-ecosystems		2	1			6	5	45	1	1	6	3		24	
Soil quality		4	1			6	5	55	4	1	6	3		33	
Fauna & Flora micro-ecosystems		4	1			8	5	65	4	1	6	3		33	
Soil quality		4	1			6	5	55	4	1	6	3		33	
Flora micro-ecosystems		4	1			8	5	65	4	1	6	3		33	
Soil quality		4	1			6	5	55	4	1	6	3		33	
Flora micro-ecosystems		4	1			8	5	65	4	1	6	2		33	
13. Fuel storage		Degradation of soil resources	Soil quality			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Construction & Operational	1	1	6	3	24		Remedy	1
Flora micro-ecosystems	1		1	6	3			24	1	1	6	3	24		
Soil quality	2		1	6	5			45	1	1	6	3	24		
Flora micro-ecosystems	2		1	6	5			45	1	1	6	3	24		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Fauna & Flora micro-ecosystems	4		1	8	5			65	4	1	6	3	33		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Flora micro-ecosystems	4		1	8	5			65	4	1	6	3	33		
Soil quality	4		1	6	5			55	4	1	6	3	33		
Flora micro-ecosystems	4		1	8	5			65	4	1	6	2	33		



1. Access and hauling along roads i.e. during the construction of roads	Erosion	Loss of fertile soil	<p><b>Direct Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of soil and growth medium for plants.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of storm water may lead to erosion along the access routes, drainage lines and low areas.</li> <li>This may lead to the loss of fertile soil and in turn effect the micro-ecosystems of the surrounding environment.</li> <li>The water resources will also be contaminated as a result of the movements of soil with runoff.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Chocking up of watercourses, a loss of land capability.</li> </ul>	Construction & Operational	2	1	6	5	45	Control	1	1	8	3	30				
		Micro-ecosystems			1	1	6	3	24		1	1	1	3	18				
Loss of fertile soil		4			1	6	5	55	1		1	6	3	24					
Micro-ecosystems		4			2	6	5	60	1		1	6	3	24					
Loss of fertile soil		4			2	6	5	60	4		2	4	3	30					
Micro-ecosystems		4			2	6	5	60	4		2	4	3	30					
Loss of fertile soil		2			1	6	5	45	1		1	6	3	24					
Micro-ecosystems		2			1	8	5	55	1		1	6	3	24					
2. Site clearing and topsoil stripping		6. Storm water runoff management features			15. Transport of construction material, mobile plant and equipment to the site	5. Mining offices i.e. operation of training centres, offices and kitchen facilities	Construction & Operational	3	1		6	5	50	Control	4	1	2	4	28





**Terrestrial Ecosystem**

Terrestrial Ecosystem															
1. Access and hauling along roads i.e. during the construction of roads	Vegetation and habitat loss	Macro and Micro organisms	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Clearing the area to construct the access roads or the servitude leads to the loss of vegetation and habitat for fauna and flora (macro and micro-organisms).</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>The loss of vegetation will affect the surrounding Fauna and Flora by creating an ecological vacuum over the cleared areas (increasing grazing and habitat utilisation outside of the area).</li> <li>As there is no vegetation the soil will be exposed to wind and water and thus the air quality and water quality will be affected through an increase of dust and sediment load in the runoff.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of biodiversity,</li> <li>Loss of soil through weathering and erosion, increase of air pollution to extensively exposed soil surfaces, choking up of water courses and drainage lines through an increase of sediment in them, due to a lack of vegetation to stabilise the soil.</li> </ul>	Construction & Operational	3	1	6	5	50	Remedy	2	1	6	4	36
		Fauna and Flora			3	1	6	5	50		2	1	6	4	36
2. Site clearing and topsoil stripping		Macro and Micro organisms			3	1	6	5	50		2	1	6	4	36
		Fauna and Flora			3	1	6	5	50		2	1	6	4	36
6. Storm water runoff management features		Macro and Micro organisms			3	1	6	5	50		2	1	6	3	27
		Fauna and Flora			3	1	6	5	50		2	1	6	3	27
1. Access and hauling along roads i.e. during the construction of roads	Influx of alien invasive vegetation	Flora micro and macro ecosystems	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Un-vegetated surfaces are prone to an influx of alien invasive vegetation as the area has been disturbed and alien invasive vegetation act as pioneers and thus thrive under such conditions.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Increase of alien vegetation causes and increase of an alien vegetation seed bank in the soil, causing an accumulation of alien invasive species, thus a lack of habitat for indigenous vegetation to establish.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat and biodiversity</li> </ul>	Construction & Operational	3	2	8	5	65	Control	2	2	6	4	40
2. Site clearing and topsoil stripping					4	2	6	5	60		2	1	6	4	36
5. Mining offices i.e. operation of training centres, offices and kitchen facilities					4	2	6	5	60		2	1	6	3	27



9. Stores, workshops & wash bays	Chemical Fires	Loss of ecosystems	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The improper storage of hazardous substances poses a risk of chemical fires. In the event of a chemical fire the impact to the surrounding environment is significant.</li> <li>If humans are exposed to the fire it will cause damage to their skin and limbs.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of finances and assets of people or companies that have had their valuables burned,</li> <li>Damage to human health and potentially death (long term and short term)</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Loss of lives, loss of ecosystems and increase of poverty of people who have lost valuables in the fire.</li> </ul>	Construction & Operational	2	1	1	0	5	65	Avoid	1	1	8	3	30
11. Fuel operating power generators					2	1	1	0	5	65		1	1	8	3	30
13. Fuel storage					1	2	1	0	5	65		1	1	8	2	20
<b>Noise Quality</b>																
1. Access and hauling along roads i.e. during the construction of roads	Noise generation	Surrounding noise quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Increased noise levels at potentially sensitive receptors which exceeding the criteria for Noise Control Regulations legislation (NCR) and SANS guidelines.</li> <li>Changing ambient sound levels could change the acceptable land use capability.</li> <li>Changing ambient sound levels could increase annoyance and potential complaints.</li> <li>Disturbing character of sound.</li> </ul> <p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>Annoyance of the local community</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of hearing from people in the area as a result of long term noise</li> </ul>	Construction & Operational	1	1	6	4	32	Control	1	1	4	3	18	
2. Site clearing and topsoil stripping					3	1	6	5	50		1	1	6	3	24	
5. Mining offices i.e. operation of training centres, offices and kitchen facilities					1	1	4	5	30		1	1	4	3	18	
11. Fuel operating power generators					1	1	4	5	30		1	1	4	3	18	



**Socio-economic**

Socio-economic																
9.Stores, workshops & wash bays	Chemical Fires	Damage to property	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The improper storage of hazardous substances poses a risk of chemical fires. In the event of a chemical fire the impact to the surrounding environment is significant.</li> <li>If humans are exposed to the fire it will cause damage to their skin and limbs.</li> </ul>	Construction & Operational Construction & Operational Construction & Operational	2	2	1	0	4	56	Avoid	1	2	8	3	33
11. Fuel operating power generators			<p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of finances and assets of people or companies that have had their valuables burned,</li> <li>Damage to human health and potentially death (long term and short term)</li> </ul>		2	2	1	0	5	70		1	1	10	2	24
13. Fuel storage			<p><b>Cumulative impact:</b></p> <p>Loss of lives, loss of ecosystems and increase of poverty of people who have lost valuables in the fire.</p>		2	2	1	0	5	70		1	1	10	2	24
14. Employment of workers and procurement of construction materials.	Loss of farm labour	Socio-economic	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Increased demand of labour force poses a risk of the local farmers losing farm labour due to competing financial income.</li> </ul>	Construction & Operational	4	2	4	5	50	Control	4	2	2	4	32	
	Population Influx – Pressure on Resources	Socio-economic	<ul style="list-style-type: none"> <li>Increased demand for labour force poses a risk of a population influx in the local district municipality.</li> <li>The increasing population will put pressure on the local municipality to provide services such as sewage, drinking water, waste management, electricity etc.</li> </ul>		4	2	4	5	50		4	2	2	4	32	
	Population Influx – Social Pathologies	Socio-economic	<ul style="list-style-type: none"> <li>Increase conflict as a result of the increased demand for jobs and not enough jobs for everyone,</li> <li>Increase consumption of alcohol, as people do not have anything to do which will also cause an increased conflict.</li> </ul>		4	2	4	5	50		4	2	2	4	32	
	Population Influx – Community Conflict	Socio-economic	<p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Reduction of crop production in the area.</li> <li>Increased poverty as too few jobs for the number of people in the area, due to the influx, and deterioration in human health as a result of poor service delivery.</li> <li>Increased poverty, too few jobs for the number of people in the area and thus a deterioration in human health as a result of poor service delivery and poor nutrition.</li> <li>Conflict with the project</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Reduction in food supply</li> <li>Increased crime and sickness</li> <li>Decrease productivity in the area and loss of income.</li> </ul>		4	3	6	5	65		4	2	2	4	32	



	Job Creation and Skills Training		<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Job creation and Skills development has a positive impact, local employed labour force will form part of a skills and training development programme.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Upliftment of local businesses and households</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Upliftment of the local economy and improvement of human life in the area.</li> </ul>		4	2	0	4	24		4	2	0	4	24
	Job Creation (Multiplier Effect) and Population Influx				4	3	0	5	35		4	2	0	4	24
<b>Heritage and Cultural Resources</b>															
2. Site clearing and topsoil stripping	Destruction of graves	Loss of heritage resources	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Proposed activities are in close proximity to identified graves thus there is a possibility of destroying features of cultural and heritage importance.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of heritage and history for the future generation of the affected community</li> </ul>	Construction & Operational	5	2	6	5	65	Avoid	5	2	6	3	39
	Degradation of cultural significance heritage sites				5	2	6	5	65		5	2	6	3	39
<b>Light Pollution</b>															
12. Lighting	Light pollution	Disruption in ecosystem especially nocturnal fauna species	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>The use of bright and excessive lighting during the proposed night shift period poses a risk of disrupting nocturnal fauna species.</li> </ul>	Construction & Operational	4	1	4	3	27	Control	4	1	2	1	7



Operational Phase

Air Quality

		Construction & Operational					Control								
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Dust generation	Air Quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Clearing of vegetation for topsoil and subsoil stripping exposes the mining operation area to dust generation.</li> <li>Exposed un-vegetated mining areas may lead to high levels of dust fallout and will affect the overall air quality.</li> <li>Dust being generated from drilling and blasting activities poses the risk of affecting the ambient air quality.</li> <li>Continuous use of haul road often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads.</li> <li>Stockpiled RoM and product as well as residue stockpiles are continuously exposed to weathering leading to the generation of fine dust particles.</li> <li>Screening operations pose a high risk to the generation of fugitive dust comprising TSP, PM10 and PM2.5.</li> <li>Backfilling of material in windy conditions also contribute to dust generation.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Continuous exposure to high levels of dust fallout may lead to unhealthy environment for employees and surrounding communities.</li> <li>High levels of dust fallout will affect the overall air quality.</li> <li>The generation of dust during these activities will affect the visual environment negatively.</li> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the respiratory function of plants</li> <li>Complaints from the community of respiratory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> <li>Flora recruitment will slow down as the vegetation will be stressed with blocked pores</li> </ul>	Construction & Operational	Control	4	2	6	5	60	2	1	6	3	27
19. Opencast mining excavations						4	2	6	5	60	4	2	4	4	40
20. Drilling & Blasting						3	2	6	5	55	4	1	4	4	36
22. RoM & product stockpiling						4	2	6	5	60	4	1	6	5	55
23. Residue stockpiles						4	2	6	5	60	4	1	4	5	45
24. Screening Operations						4	2	6	5	60	4	1	6	5	55
25. Discard disposal (backfilling of mining area)						3	2	6	5	55	1	1	6	5	40
31. Vehicular activity on haul roads; and operation of mining equipment						4	2	6	5	60	4	1	4	5	45
32. Bulk transporting of Ore to market on Public roads	4	3	4	5	55	4	1	4	3	27					



18. Topsoil and subsoil stripping & stockpiling for mining operation area	CO <sub>2</sub> emissions	Air Quality	<u>Direct/Indirect/Cumulative Impact:</u> <ul style="list-style-type: none"> <li>The use of diesel operated construction equipment will cause a contributing factor the BCR Minerals (Pty) Ltd carbon footprint.</li> <li>Haul vehicles will cause a contributing factor the BCR Minerals (Pty) Ltd carbon footprint.</li> </ul>	Construction & Operational	4	1	4	5	45	Control	4	1	2	4	28
19. Opencast mining excavations					4	2	4	5	50		4	1	2	4	28
22. RoM & product stockpiling					4	2	4	5	50		4	1	2	5	35
24. Screening Operations					4	2	6	5	60		4	1	2	5	35
31. Vehicular activity on haul roads; and operation of mining equipment					4	2	6	5	60		4	1	4	5	45
32. Bulk transporting of Ore to market on Public roads					4	3	4	5	55		4	1	2	5	35
<b>Human Health and Safety</b>															
17. Employment of workers	Health and Safety of employees	Human health and safety environment	<u>Direct/Indirect/Cumulative Impact:</u> <ul style="list-style-type: none"> <li>Increased demand for labour and employees from different cultures may pose a risk to the lack of knowledge and skills on health and safety in the work place.</li> <li>Different human behaviours addresses different situations and;</li> <li>If there is not a simplified system of managing health and safety risk loss or injury of human life may be the result.</li> </ul>	Construction & Operational	4	1	6	5	55	Control	4	1	6	3	33



18. Topsoil and subsoil stripping & stockpiling for mining operation area	Dust generation	Human health and safety environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed un-vegetated mining areas may lead to high levels of dust fallout and will affect the overall air quality.</li> <li>Vegetation is removed, grading and paving takes place using a range of road construction equipment.</li> <li>Dust being generated from drilling and blasting activities poses the risk of affecting the ambient air quality.</li> <li>Continuous use of haul road often leads to the generation of fugitive dust.</li> <li>Stockpiled RoM and product are continuously exposed to weathering leading the generation of fine dust particles.</li> <li>Stockpiled residue is continuously exposed to weathering leading the generation of fine dust particles.</li> <li>Screening operations poses a high risk to the generation of fugitive dust</li> <li>Backfilling of material in windy conditions also contribute to dust generation.</li> <li>The activities listed above often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the repertory function of plants</li> <li>Complaints from the community of repertory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> </ul>	Construction & Operational	Control	4	2	6	5	60	2	1	6	3	27
19. Opencast mining excavations						4	1	6	5	55	4	2	4	4	40
20. Drilling & Blasting						3	2	6	5	55	4	1	4	4	36
22. RoM & product stockpiling						4	2	8	5	70	4	1	6	5	55
23. Residue stockpiles						4	2	6	5	60	4	1	4	5	45
24. Screening Operations						4	2	8	5	70	4	1	6	5	55
25. Discard disposal (backfilling of mining area)						3	2	8	5	65	1	1	4	5	30
31. Vehicular activity on haul roads; and operation of mining equipment						4	2	6	5	60	4	1	4	5	45
32. Bulk transporting of Ore to market on Public roads						4	3	4	5	55	4	1	4	3	27



<p><b>20. Drilling &amp; Blasting</b></p>	<p>Damage to surrounding landowner properties</p>	<p>Human health and safety environment</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Blasting outside the safe zones or in areas within close proximity to properties of landowner's poses a risk of damaging properties.</li> <li>Fly rock poses a human health and safety risk.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Investigations into incident related to damage of landowners property is time consuming and may cause a delay in production.</li> <li>Costly investigations and report generation.</li> <li>Pose a high risk of compensation claims from surrounding communities and landowners.</li> </ul>	<p>Construction &amp; Operational</p>	<p>4</p>	<p>2</p>	<p>6</p>	<p>5</p>	<p>60</p>	<p><b>Avoid</b></p>	<p>4</p>	<p>2</p>	<p>6</p>	<p>3</p>	<p>36</p>
<p><b>25. Waste generation, storage and disposal</b></p>	<p>Illegal dumping</p>	<p>Human health and safety environment</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Dumping of generated water in areas other than is approved by the authorisation or EMPr poses a high risk of polluting numerous sources i.e. Water and soil.</li> <li>The dumping of general waste poses a choking risk to grazing animals.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water as well as soil resources.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>This may lead to the degradation of conditions for the aquatic ecology to thrive.</li> <li>Hazardous Leachates from illegal dumps also poses a risk to the health of surrounding communities.</li> </ul>	<p>Construction &amp; Operational</p>	<p>4</p>	<p>2</p>	<p>8</p>	<p>5</p>	<p>70</p>	<p><b>Control</b></p>	<p>4</p>	<p>1</p>	<p>4</p>	<p>3</p>	<p>27</p>
<p><b>26. Chemical Toilets</b></p>	<p>Smell nuisance</p>	<p>Human health and safety environment</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Putrid smell or a smell that is displeasing to humans</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Fumes from hazardous substances could cause nausea or headaches.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Increase complaints from the local community</li> </ul>	<p>Construction &amp; Operational</p>	<p>1</p>	<p>1</p>	<p>6</p>	<p>5</p>	<p>40</p>	<p><b>Avoid</b></p>	<p>1</p>	<p>1</p>	<p>4</p>	<p>4</p>	<p>24</p>





**Topography and Visual Environment**

Topography and Visual Environment															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Dust generation	Topography and Visual Environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed un-vegetated mining areas may lead to high levels of dust fallout and will affect the overall air quality.</li> <li>Vegetation is removed, grading and paving takes place using a range of road construction equipment.</li> <li>Dust being generated from drilling and blasting activities poses the risk of affecting the ambient air quality.</li> <li>Continuous use of haul road often leads to the generation of fugitive dust.</li> <li>Stockpiled RoM and product are continuously exposed to weathering leading the generation of fine dust particles.</li> <li>Stockpiled residue is continuously exposed to weathering leading the generation of fine dust particles.</li> <li>Screening operations poses a high risk to the generation of fugitive dust</li> <li>Backfilling of material in windy conditions also contribute to dust generation.</li> <li>The activities listed above often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the respiratory function of plants</li> <li>Complaints from the community of respiratory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> </ul>	Construction & Operational	Control	4	2	4	5	50	2	1	6	3	27
19. Opencast mining excavations						4	2	6	5	60	4	2	4	4	40
20. Drilling & Blasting						3	2	4	5	45	4	1	4	4	36
22. RoM & product stockpiling						4	2	4	5	50	4	1	6	5	55
23. Residue stockpiles						4	2	6	5	60	4	1	4	5	45
24. Screening Operations						4	2	4	5	50	4	1	6	5	55
25. Discard disposal (backfilling of mining area)						5	2	4	5	55	1	1	2	5	20
31. Vehicular activity on haul roads; and operation of mining equipment						4	2	6	5	60	4	1	4	5	45
32. Bulk transporting of Ore to market on Public roads						4	3	4	5	55	4	1	4	3	27



18. Topsoil and subsoil stripping & stockpiling for mining operation area	Alteration of the visual environment and topography	Topography and Visual Environment	<b>Direct Impact:</b> <ul style="list-style-type: none"> <li>Topsoil and subsoil stripping will alter the topography and visual environment throughout the mining operation.</li> <li>Stockpiles of residue material over an extended time potentially alter the topography and visual environment.</li> </ul>	Construction & Operational	4	2	4	5	50	Remedy	4	1	4	5	45
23. Residue stockpiles			<b>Indirect Impact:</b> <ul style="list-style-type: none"> <li>Related to the sense of place being disturbed.</li> </ul>		5	2	4	5	55		4	1	4	4	36
			<b>Cumulative impact:</b> <ul style="list-style-type: none"> <li>Permanent change to the visual environment and the topography</li> </ul>												

**Surface Water Quality**

18. Topsoil and subsoil stripping & stockpiling for mining operation area	Hydrocarbon Contamination	Surface Water quality	<b>Direct Impact:</b> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> <li>The use of drill Riggs poses a high risk of hydrocarbon spills.</li> <li>Hydrocarbon spills can occur where heavy machinery such as the screening</li> </ul>	Construction & Operational	4	2	8	5	70	Control	4	2	6	3	36
19. Opencast mining excavations			4		2	8	5	70	4		1	4	3	27	
20. Drilling & Blasting			4		2	8	5	70	4		1	6	4	44	
23. Screening Operations			4		1	8	5	65	4		1	2	3	21	
24. Discard disposal (backfilling of mining area)			4		2	6	5	60	3		1	6	3	30	
27. River crossings			3		2	6	5	55	4		1	6	4	44	
29. Storage of fuel and lubricants in temporary facilities			2		2	8	5	60	1		1	6	3	24	



<p>30. Vehicular activity on haul roads; and operation of mining equipment</p>			<p>plant and hauling vehicles are parked because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. This poses a risk of hydrocarbon spills if equipment is not maintained.</p> <ul style="list-style-type: none"> <li>• During backfilling activities equipment and plant are used. This poses a risk of hydrocarbon spills if equipment are not maintained.</li> <li>• The construction of improper storage facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>• Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>• The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>• The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>• The water resource will be contaminated and unfit for use.</li> <li>• The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>		<table border="1"> <tr> <td>4</td> <td>1</td> <td>8</td> <td>5</td> <td>65</td> </tr> </table>	4	1	8	5	65		<table border="1"> <tr> <td>4</td> <td>1</td> <td>4</td> <td>4</td> <td>36</td> </tr> </table>	4	1	4	4	36																																								
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<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p>	<p>Sedimentation and siltation of watercourses</p>	<p>Surface Water quality</p>	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>• Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>• Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>• Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>• When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> <li>• Stockpiling excavated material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>• Stockpiling RoM and product material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>• Stockpiling residue material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>• Stockpiling screened material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>• Backfilling material through or in close proximity to drainage lines may cause</li> </ul>	<p>Construction &amp; Operational</p>	<table border="1"> <tr> <td>4</td> <td>2</td> <td>6</td> <td>5</td> <td>60</td> </tr> <tr> <td>4</td> <td>3</td> <td>8</td> <td>5</td> <td>75</td> </tr> <tr> <td>4</td> <td>2</td> <td>8</td> <td>5</td> <td>70</td> </tr> <tr> <td>4</td> <td>2</td> <td>8</td> <td>5</td> <td>70</td> </tr> <tr> <td>4</td> <td>2</td> <td>8</td> <td>5</td> <td>70</td> </tr> </table>	4	2	6	5	60	4	3	8	5	75	4	2	8	5	70	4	2	8	5	70	4	2	8	5	70	<p>Control</p>	<table border="1"> <tr> <td>4</td> <td>2</td> <td>6</td> <td>3</td> <td>36</td> </tr> <tr> <td>4</td> <td>2</td> <td>6</td> <td>4</td> <td>48</td> </tr> <tr> <td>4</td> <td>1</td> <td>6</td> <td>5</td> <td>55</td> </tr> <tr> <td>4</td> <td>1</td> <td>6</td> <td>4</td> <td>44</td> </tr> <tr> <td>4</td> <td>1</td> <td>6</td> <td>3</td> <td>33</td> </tr> </table>	4	2	6	3	36	4	2	6	4	48	4	1	6	5	55	4	1	6	4	44	4	1	6	3	33
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<p>23. Screening Operations</p>																																																									



24. Discard disposal (backfilling of mining area)			<p>sedimentation and siltation of watercourses if not managed properly.</p> <ul style="list-style-type: none"> <li>Excavating, stockpiling and transport of material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Runoff from lay down areas, construction areas, mining areas, stockpile areas, roads etc. potentially contain sediment and silt that poses a risk of affecting surrounding water courses and drainage lines.</li> <li>Runoff from exposed un-vegetated areas poses a risk in contaminating nearby streams, rivers, and drainage lines</li> </ul>		4	2	8	5	70		4	1	6	3	33
27. River crossings					4	2	8	5	70		4	1	6	4	44
30. Vehicular activity on haul roads; and operation of mining equipment			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul>		4	2	8	5	70		4	1	6	4	44
32. Water Management			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>		4	2	8	5	70		4	1	6	3	33
33. Rehabilitation of mining areas					4	2	8	5	70		4	1	4	4	36
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Water level reduction and contamination	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The reduction in water levels as well as contamination of the water resource that may be caused by alternating the topography during site clearing and topsoil stripping poses a risk to affecting the surface and sub-surface water quality as well as the downstream users.</li> <li>Improper installation of river crossing infrastructure poses a risk in water level reduction and contamination of downstream water users i.e. through blocking of the natural flow of streams/rivers.</li> </ul>	Construction & Operational	4	2	6	5	60	Control	4	1	4	3	27
27. River crossings			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> </ul>		4	2	6	5	60		4	1	2	3	21
28. Water supply (potable & process)			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>		4	2	6	5	60		4	1	4	3	27
32. Water Management							4	2	8		5	70	4	1	4



18. Topsoil and subsoil stripping & stockpiling for mining operation area	Alteration of drainage patterns	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The construction of access roads through drainage lines may lead to the siltation of streams as well as lead to erosion along the river banks that will affect the surface water quality negatively.</li> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding Wetlands Site clearing and topsoil stripping through drainage lines may lead to the siltation of streams as well as lead to erosion along the river banks.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding.</li> <li>Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> <li>Siltation of streams as well as lead to erosion along the river banks</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Damage to the aquatic ecosystem and surface quality, possible extinction.</li> </ul>	Construction & Operational	5	3	6	5	70	Remedy	4	2	6	4	48
22. Residue stockpiles					5	3	8	5	80		4	1	6	4	44
27. River crossings					5	2	8	5	75		4	1	4	3	27
32. Water Management					5	2	8	5	75		4	1	4	5	45
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of upstream tributaries and reduction in water in the catchment	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The destruction of tributaries may lead to a limited volume of water available to the downstream users.</li> <li>The reduction in water in the catchment may cause the degradation of surface water quality.</li> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of aquatic species</li> </ul>	Construction & Operational	5	2	6	5	65	Remedy	4	1	4	4	36
19. Opencast mining excavations					4	3	6	5	65		4	1	6	4	44
32. Water Management					4	2	8	5	70		4	1	4	3	27



Activity	Contamination of water resources	Surface Water quality	Impact Description	Construction & Operational	Avoid								
19. Opencast mining excavations	Contamination of water resources	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the operational phase of the mining operations, potential pollutants are used such as high levels of nitrates.</li> <li>Improper management of potential pollutants may lead to the degradation of water quality (both surface and sub-surface).</li> <li>Improper management of effluent from store, workshops, and wash bays poses a high risk to contaminating water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding Improper management of blasting activities poses the risk of contaminating water resources with pollutants such as high content of Nitrates</li> <li>Water seeping from stockpiles poses a risk of leading to elevated concentrations of heavy metals and other elements in the groundwater environment, and can potentially be acidic.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or bunded poses a risk of forming potentially hazardous leachates.</li> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water resources.</li> <li>Improper management of effluent from chemical toilets poses a high risk to contaminating water resources</li> <li>Storm water run-off from river crossing structures containing pollutants poses a risk in contaminating the surrounding water resources.</li> <li>The poor management of onsite water i.e. Storm water, process water, effluent, potable water etc. may lead to the contamination of water resources</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> <li>The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.</li> <li>Sub-surface material and ore exposed to weathering may release pollutants to the water resources</li> <li>Alteration to the conditions of the water resources may negatively affect the aquatic ecology.</li> </ul> <p><b>Cumulative Impacts:</b></p>	4	2	8	5	70	4	1	6	3	33
20. Drilling & Blasting				4	3	8	5	75	4	1	6	4	44
21. RoM & product stockpiling				4	2	8	5	70	4	1	6	3	33
22. Residue stockpiles				4	2	8	5	70	4	1	6	3	33
23. Screening Operations				4	3	8	5	75	4	1	6	3	33
24. Discard disposal (backfilling of mining area)				4	2	8	5	70	4	1	4	3	27
25. Waste generation, storage and disposal				4	1	8	5	65	4	1	4	3	27
26. Chemical Toilets				1	1	6	5	40	1	1	6	3	24
27. River crossings				4	2	6	5	60	4	1	6	3	33
28. Water supply (potable & process)				4	2	8	5	70	4	1	2	2	14



29. Storage of fuel and lubricants in temporary facilities			<ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> <li>When this water reaches surface water bodies or the groundwater it can negatively affect the water quality.</li> </ul>		2	1	8	5	55		1	1	6	3	24
32. Water Management					4	2	8	5	70		4	1	6	3	33
25. Waste generation, storage and disposal	Illegal dumping	Surface water contamination	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Dumping of generated waste (hazardous and general) in areas other than is approved by the authorisation or EMP poses a high risk of polluting numerous sources i.e. Water and soil.</li> <li>The dumping of general waste poses a choking risk to grazing animals.</li> <li>Hazardous Leachates from illegal dumps also poses a risk to the health of surrounding communities through contamination of water and soil resources.</li> <li>Destruction of the soil microbes.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage poses a risk of contaminating both surface and sub-surface water as well as soil resources. This may lead to the degradation of conditions for the soil and aquatic ecology.</li> <li>Encourage vectors and diseases to develop in the soil and water resources</li> </ul> <p><b>Cumulative Effect:</b></p> <ul style="list-style-type: none"> <li>Human illnesses and at times death from utilising these resources.</li> <li>Destruction of flora recruitment in the soil</li> <li>Increase of alien plant growth as the soil is degraded</li> <li>Loss of aquatic life as the water is too polluted and deoxygenated as a result for life to function.</li> </ul>	Construction & Operational	4	2	8	5	70	Control	4	1	4	3	27



**Ground Water Quality**

Ground Water Quality															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Hydrocarbon Contamination	Groundwater quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> <li>The use of drill Riggs poses a high risk of hydrocarbon spills.</li> <li>Hydrocarbon spills can occur where heavy machinery such as the screening plant and hauling vehicles are parked because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. This poses a risk of hydrocarbon spills if equipment is not maintained.</li> <li>During backfilling activities equipment and plant are used. This poses a risk of hydrocarbon spills if equipment are not maintained.</li> <li>The construction of improper storage facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul>	Construction & Operational	4	2	8	5	70	Control	4	2	6	2	24
19. Opencast mining excavations					4	2	8	5	70		4	1	4	2	18
20. Drilling & Blasting					4	2	8	5	70		4	1	6	2	22
23. Screening Operations					4	1	8	5	65		4	1	2	3	21
24. Discard disposal (backfilling of mining area)					4	2	6	5	60		3	1	6	2	20
27. River crossings					3	2	6	5	55		4	1	6	4	44
29. Storage of fuel and lubricants in temporary facilities					2	1	8	5	55		1	1	6	1	8





30. Vehicular activity on haul roads; and operation of mining equipment			<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>		4	1	8	5	65		4	1	4	2	18
18. Topsoil and subsoil stripping & stockpiling for mining operation area					4	2	6	5	60		4	1	4	3	27
27. River crossings			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The reduction in water levels as well as contamination of the water resource that may be caused by alternating the topography during site clearing and topsoil stripping poses a risk to affecting the surface and sub-surface water quality as well as the downstream users.</li> <li>Improper installation of river crossing infrastructure poses a risk in water level reduction and contamination of downstream water users i.e. through blocking of the natural flow of streams/ivers.</li> </ul>		4	2	6	5	60		4	1	2	3	21
28. Water supply (potable & process)	Water level reduction and contamination	Groundwater quality	<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>	Construction & Operational	4	2	6	5	60	Control	4	1	4	3	27
32. Water Management					4	2	8	5	70		4	1	4	3	27



Activity	Contamination of water resources	Groundwater quality	Impact Description	Construction & Operational	Construction & Operational								
19. Opencast mining excavations	Contamination of water resources	Groundwater quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the operational phase of the mining operations, potential pollutants are used such as high levels of nitrates.</li> <li>Improper management of potential pollutants may lead to the degradation of water quality (both surface and sub-surface).</li> <li>Improper management of effluent from store, workshops, and wash bays poses a high risk to contaminating water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding Improper management of blasting activities poses the risk of contaminating water resources with pollutants such as high content of Nitrates</li> <li>Water seeping from stockpiles poses a risk of leading to elevated concentrations of heavy metals and other elements in the groundwater environment, and can potentially be acidic.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or banded poses a risk of forming potentially hazardous leachates.</li> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water resources.</li> <li>Improper management of effluent from chemical toilets poses a high risk to contaminating water resources</li> <li>Storm water run-off from river crossing structures containing pollutants poses a risk in contaminating the surrounding water resources.</li> <li>The poor management of onsite water i.e. Storm water, process water, effluent, potable water etc. may lead to the contamination of water resources</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> <li>The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.</li> <li>Sub-surface material and ore exposed to weathering may release pollutants to the water resources</li> <li>Alteration to the conditions of the water resources may negatively affect the aquatic ecology.</li> </ul>	4	2	8	5	70	4	1	6	2	22
20. Drilling & Blasting				4	2	8	5	70	4	1	6	3	33
21. RoM & product stockpiling				4	2	8	5	70	4	1	6	2	22
22. Residue stockpiles				4	2	8	5	70	4	1	6	2	22
23. Screening Operations				4	3	8	5	75	4	1	6	2	22
24. Discard disposal (backfilling of mining area)				4	2	8	5	70	4	1	4	2	18
25. Waste generation, storage and disposal				4	1	8	5	65	4	1	4	2	18
26. Chemical Toilets				1	1	6	5	40	1	1	6	2	16
27. River crossings				4	2	6	5	60	4	1	6	2	22
28. Water supply (potable & process)				4	2	8	5	70	4	1	2	1	7
29. Storage of fuel and lubricants in temporary facilities	2	1	8	5	55	1	1	6	1	8			



32. Water Management			<p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> <li>When this water reaches surface water bodies or the groundwater it can negatively affect the water quality.</li> </ul>		4	2	8	5	70		4	1	6	2	22
21. RoM & product stockpiling			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water as well as soil resources. This may lead to the degradation of conditions for the aquatic ecology to thrive.</li> <li>Potential pollutant in the residue material resulting from mining operation may lead to the formation of leachate.</li> </ul>		5	3	8	5	80		4	1	6	3	33
22. Residue stockpiles	Hazardous Leachate	Groundwater quality	<p><b>Indirect impact:</b></p> <ul style="list-style-type: none"> <li>Pollution in the water (ground and surface) will cause aquatic species to die from the toxins.</li> <li>The leachate may contain toxins that are hazardous to the aquatic ecology and water resources.</li> <li>The water quality will deteriorate and the potability will diminish.</li> </ul>	Operational	5	3	8	5	80	Control	4	1	6	3	33
25. Waste generation, storage and disposal			<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>Extinction of aquatic ecosystems, fauna and flora, an increase of alien invasive species and a loss of water resources.</li> <li>Increase of diseases and toxin contamination of the ground water and surface water resources.</li> </ul>	Operational	4	2	8	5	70	Control	4	1	6	2	22



**Wetland and Aquatic Ecology**

Wetland and Aquatic Ecology															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of Wetlands	Wetlands and Aquatic Ecology	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Site clearing and topsoil stripping in Wetlands will cause the loss of micro and macro aquatic species.</li> </ul>	Construction & Operational	5	2	8	5	75	Avoid	3	1	6	4	40
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Contamination	Wetlands and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> <li>The use of drill Riggs poses a high risk of hydrocarbon spills.</li> <li>Hydrocarbon spills can occur where heavy machinery such as the screening plant and hauling vehicles are parked because they contain large volumes of lubricating oils, hydraulic oils, and diesel to run. This poses a risk of hydrocarbon spills if equipment is not maintained.</li> <li>During backfilling activities equipment and plant are used. This poses a risk of hydrocarbon spills if equipment are not maintained.</li> <li>The construction of improper storage facilities poses a risk of the surrounding environment to be exposed to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> </ul>	Construction & Operational	4	2	8	5	70	Avoid	4	2	6	3	36
27. River crossings					4	2	8	5	70		4	2	6	3	36
30. Vehicular activity on haul roads; and operation of mining equipment					1	1	6	5	40		1	1	4	4	24



			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>												
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> <li>Stockpiling excavated material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Stockpiling RoM and product material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Stockpiling residue material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Stockpiling screened material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Backfilling material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Excavating, stockpiling and transport of material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly.</li> <li>Runoff from lay down areas, construction areas, mining areas, stockpile areas, roads etc. potentially contain sediment and silt that poses a risk of affecting</li> </ul>	Construction & Operational	Control	4	2	6	5	60	4	2	6	3	36
19. Opencast mining excavations						4	2	8	5	70	4	2	6	4	48
21. RoM & product stockpiling						4	2	8	5	70	4	1	6	5	55
22. Residue stockpiles						4	2	8	5	70	4	1	6	4	44
23. Screening Operations						4	2	8	5	70	4	1	6	3	33
24. Discard disposal (backfilling of mining area)						4	2	8	5	70	4	1	6	3	33
27. River crossings						4	2	8	5	70	4	1	6	4	44



30. Vehicular activity on haul roads; and operation of mining equipment			<p>surrounding water courses and drainage lines.</p> <ul style="list-style-type: none"> <li>Runoff from exposed un-vegetated areas poses a risk in contaminating nearby streams, rivers, and drainage lines</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul>			4	2	8	5	70		4	1	6	4	44		
32. Water Management			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>			4	2	8	5	70		4	1	6	3	33		
33. Rehabilitation of mining areas						4	2	8	5	70		4	1	4	4	36		
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Alteration of drainage patterns	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The construction of access roads through drainage lines may lead to the siltation of streams as well as lead to erosion along the river banks that will affect the surface water quality negatively.</li> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding Wetlands Site clearing and topsoil stripping through drainage lines may lead to the siltation of streams as well as lead to erosion along the river banks.</li> </ul>	Construction & Operational	Remedy	5	3	6	5	70		4	2	6	4	48		
19. Opencast mining excavations			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding.</li> <li>Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> <li>Siltation of streams as well as lead to erosion along the river banks</li> </ul>			5	2	8	5	75		4	2	6	5	60		
22. RoM & product stockpiling			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the drainage patterns may lead to the degradation of downstream or surrounding.</li> <li>Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> <li>Siltation of streams as well as lead to erosion along the river banks</li> </ul>			5	2	8	5	75		4	2	6	5	60		
23. Residue stockpiles			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Damage to the aquatic ecosystem and surface quality, possible extinction.</li> </ul>			5	2	8	5	75		4	1	6	4	44		
27. River crossings								5	2	8	5	75		4	1	4	3	27
32. Water Management								5	2	8	5	75		4	1	4	5	45



18. Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of upstream tributaries and reduction in water in the catchment	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The destruction of tributaries may lead to a limited volume of water available to the downstream users.</li> <li>The reduction in water in the catchment may cause the degradation of surface water quality.</li> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of aquatic species</li> </ul>	Construction & Operational	5	2	6	5	65	Remedy	4	1	4	4	36
19. Opencast mining excavations					4	3	6	5	65		4	1	6	3	33
32. Water Management					4	2	8	5	70		4	1	4	3	27
19. Opencast mining excavations	Contamination of water resources	Wetlands and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the operational phase of the mining operations, potential pollutants are used such as high levels of nitrates.</li> <li>Improper management of potential pollutants may lead to the degradation of water quality (both surface and sub-surface).</li> <li>Improper management of effluent from store, workshops, and wash bays poses a high risk to contaminating water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding Improper management of blasting activities poses the risk of contaminating water resources with pollutants such as high content of Nitrates</li> <li>Water seeping from stockpiles poses a risk of leading to elevated concentrations of heavy metals and other elements in the groundwater environment, and can potentially be acidic.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or banded poses a risk of forming potentially hazardous leachates.</li> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water resources.</li> <li>Improper management of effluent from chemical toilets poses a high risk to contaminating water resources</li> <li>Storm water run-off from river crossing structures containing pollutants poses a risk in contaminating the surrounding water resources.</li> </ul>	Construction & Operational	4	2	8	5	70	Avoid	4	1	6	3	33
20. Drilling & Blasting					4	2	8	5	70		4	1	6	4	44
21. RoM & product stockpiling					4	2	8	5	70		4	1	6	3	33
22. Residue stockpiles					4	2	8	5	70		4	1	6	3	33
23. Screening Operations					4	2	8	5	70		4	1	6	3	33
24. Discard disposal (backfilling of mining area)					4	2	8	5	70		4	1	4	3	27
25. Waste generation, storage and disposal					4	1	8	5	65		4	1	4	3	27



Activity	Receptor	Impact Description	Pre-Mitigation					Mitigation						
			1	2	3	4	5	1	2	3	4	5		
26. Chemical Toilets 27. River crossings 28. Water supply (potable & process) 29. Storage of fuel and lubricants in temporary facilities 32. Water Management		<ul style="list-style-type: none"> <li>The poor management of onsite water i.e. Storm water, process water, effluent, potable water etc. may lead to the contamination of water resources</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> <li>The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.</li> <li>Sub-surface material and ore exposed to weathering may release pollutants to the water resources</li> <li>Alteration to the conditions of the water resources may negatively affect the aquatic ecology.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> <li>When this water reaches surface water bodies or the groundwater it can negatively affect the water quality.</li> </ul>	1	1	6	5	40	1	1	6	3	24		
			4	2	6	5	60	4	1	6	3	33		
			4	2	8	5	70	4	1	2	2	14		
			2	1	8	5	55	1	1	6	3	24		
			4	2	8	5	70	4	1	6	3	33		
22. Residue stockpiles	Hazardous Leachate	Aquatic ecology	Operational	5	3	8	5	80	Control	4	1	6	3	33
25. Waste generation, storage and disposal			Operational	5	2	8	5	75	4	1	6	2	22	





**Water Resource Users and Management**

Water Resource Users and Management															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Water level reduction and contamination	Downstream water users	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The reduction in water levels as well as contamination of the water resource that may be caused by alternating the topography during site clearing and topsoil stripping poses a risk to affecting the surface and sub-surface water quality as well as the downstream users.</li> <li>Improper management of water usage and installation of improper storm water features and infrastructure poses a risk of reducing the water levels for downstream users.</li> <li>Improper installation of river crossing infrastructure poses a risk in water level reduction and contamination of downstream water users i.e. through blocking of the natural flow of streams/ivers.</li> <li>Water wastage and over exploitation of water resources poses a risk in water level reduction.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Exposed boreholes may result in both sub-surface and surface water quality to be affected.</li> <li>The reduction of water levels of rivers/watercourses/underground water tables poses a risk of affecting both surface and sub-surface water resources.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Over exposing for an extended time may lead to water shortages and poses a negative effect to the downstream users.</li> </ul>	Construction & Operational	Control	4	2	6	5	60	4	1	4	3	27
27. River crossings						4	2	6	5	60	4	1	2	3	21
28. Water supply (potable & process)						4	2	6	5	60	4	1	4	3	27
32. Water Management						4	2	8	5	70	4	1	4	3	27



18. Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of upstream tributaries and reduction in water in the catchment	Downstream water users	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The destruction of tributaries may lead to a limited volume of water available to the downstream users.</li> <li>The reduction in water in the catchment may cause the degradation of surface water quality.</li> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Alteration of the upstream drainage lines may lead to the degradation of downstream or surrounding Wetlands which in its turn may affect the aquatic micro and macro ecology.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of aquatic species</li> </ul>	Construction & Operational	5	3	6	5	70	Remedy	4	1	4	4	36
19. Opencast mining excavations					4	3	6	5	65		4	1	6	3	33
32. Water Management					4	2	8	5	70		4	1	4	3	27
28. Water supply (potable & process)	Improper water storage management Improper water storage management	Wastage of water resource	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of water storage facilities i.e. Not inspecting or regularly maintaining the storage tanks poses a risk of leaks and contamination.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Pressure on the natural water resource.</li> </ul>	Construction & Operational	4	2	6	5	60	Avoid	4	1	4	3	27
		Water contamination			4	2	8	5	70		4	1	4	2	18
Wastage of water resource		4			1	6	5	55	4		1	4	3	27	
Water contamination		4			1	8	5	65	4		1	4	3	27	
32. Water Management															



**Soil Quality**

Soil Quality															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Degradation of soil resources	Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Any spills outside of the bunded area can have an impact on the soil resource as soil is highly valuable improper management of these soils may cause the loss of soil and loss of the growth medium.</li> <li>Pollution or contamination of the soil may cause the micro-ecosystems to be destroyed.</li> <li>Allowing Alien invasive plants to establish in soil stockpiles, allows an alien plants seed bank to be created reducing the potential for indigenous plants to grow.</li> <li>If not managed properly, fertile soil will be lost during site clearance, topsoil striping and stockpiling.</li> <li>Improper management of blasting activities poses the risk of contaminating soil resources with pollutants such as a high content of Nitrates. The presence of pollutant in the soils results in the degradation of the quality.</li> <li>Improper management of stockpile area i.e. mixing of topsoil and fertile soils with subsoil or RoM product poses a risk of degrading of soil quality.</li> <li>Backfilling of soil layers will impact on the land capability by restoring the land capability to some extent because vegetation will be supported and therefore returned to the planned post mining land capability such as arable land or grazing.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or bunded poses a risk of forming potentially hazardous leachates.</li> <li>Continuous leaking, spills or lack of maintenance poses a risk to contaminating the surrounding soils and degrading the soil quality. This will affect the micro-ecosystems in a negative manner.</li> <li>As part of the maintenance related to roads, valuable topsoil's may be removed.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> <li>Improper management of topsoil or fertile soil may cause the loss of flora micro-ecosystems and cause the degradation of soil quality.</li> </ul>	Construction & Operational	Remedy	3	1	6	5	50	3	1	6	3	30
		Flora micro-ecosystems				3	1	6	5	50	3	1	6	3	30
19. Opencast mining excavations		Soil quality				5	1	6	5	60	4	1	6	5	55
Flora micro-ecosystems		5				1	8	5	70	4	1	6	5	55	
20. Drilling & Blasting		Soil quality				4	1	8	5	65	4	1	6	5	55
Flora micro-ecosystems		5				1	8	5	70	4	1	6	5	55	
21. RoM & product stockpiling		Soil quality				5	1	6	5	60	4	1	6	5	55
Flora micro-ecosystems		5				1	6	5	60	4	1	6	5	55	
22. Residue stockpiles		Soil quality				5	1	8	5	70	4	1	6	5	55
Flora micro-ecosystems		5				1	8	5	70	4	1	6	5	55	
23. Screening Operations		Soil quality				5	1	8	5	70	4	1	6	4	44
Flora micro-ecosystems	5	1	8	5	70	4	1	6	3	33					
24. Discard disposal (backfilling of mining area)	Soil quality	5	1	8	5	70	4	1	6	4	44				
Flora micro-ecosystems	5	1	8	5	70	4	1	6	4	44					
25. Waste generation, storage and disposal	Soil quality	4	1	6	5	55	4	1	4	3	27				
Flora micro-ecosystems	4	1	6	5	55	4	1	4	3	27					
26. Chemical Toilets	Soil quality	1	1	6	5	40	1	1	4	4	24				
	Flora micro-ecosystems	1	1	6	5	40	1	1	4	4	24				



29. Storage of fuel and lubricants in temporary facilities		Soil quality	<p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>		2	1	8	5	55		1	1	6	3	24
		Flora micro-ecosystems			2	1	8	5	55		1	1	6	3	24
30. Vehicular activity on haul roads; and operation of mining equipment	Soil quality	5			1	8	5	70	4		1	6	3	33	
33. Rehabilitation of mining areas	Flora micro-ecosystems	5			1	8	5	70	4		1	6	2	22	
	Soil quality	5			1	10	5	80	1		1	6	3	24	
		Flora micro-ecosystems			5	1	10	5	80		1	1	6	3	24
19. Opencast mining excavations	Hydrocarbon Contamination	Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the construction operation and decommissioning phases plant and equipment using hydrocarbons will be used.</li> <li>This poses a risk of hydrocarbon spills if equipment is not maintained or accidental leaks occur.</li> <li>The size and magnitude of the spill and level of contamination may vary from insignificant to significant, which may affect the surrounding soil and water quality (both surface and sub-surface).</li> <li>Storm water from dirty areas such as the mining area, lay down areas, workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to contaminate water resources.</li> <li>The construction of improper generator facilities poses a risk of the surrounding environment to be exposes to continuous leaking of hydrocarbons leading possibly contaminating both surface and sub-surface water sources as well as the soils surrounding the facility.</li> <li>The lack of inspections or regular maintenance of facilities such as water pumps poses a risk to contaminating the surface and sub-surface water resource.</li> <li>The improper management of oil separators/sumps may lead to the contamination of the surrounding environment.</li> </ul>	Construction & Operational	4	1	8	5	65	Control	4	1	4	3	27
20. Drilling & Blasting					4	1	8	5	65		4	1	6	4	44
21. RoM & product stockpiling					4	1	8	5	65		4	1	6	3	33
23. Screening Operations					4	1	8	5	65		4	1	2	3	21
24. Discard disposal (backfilling of mining area)					3	2	8	5	65		4	1	6	4	44
29. Storage of fuel and lubricants in temporary facilities					5	1	8	5	70		1	1	6	3	24



30. Vehicular activity on haul roads; and operation of mining equipment			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>		5	1	8	5	70		4	1	4	4	36
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Erosion	Loss of fertile soil	<p><b>Direct Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of soil and growth medium for plants.</li> <li>Un-vegetated areas exposed to weathering for an extended period of time will lead to erosion. Erosion prone areas have a high risk of losing fertile soil caused by flash floods.</li> <li>Improper installation of river crossing infrastructure poses the risk of contributing to the conditions causing erosion i.e. Un-vegetated and exposed river/watercourse banks.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of storm water may lead to erosion along the access routes, drainage lines and low areas.</li> <li>This may lead to the loss of fertile soil and in turn affect the micro-ecosystems of the surrounding environment.</li> <li>The water resources will also be contaminated as a result of the movements of soil with runoff.</li> <li>Erosion poses a risk of contributing to sedimentation and siltation of rivers/watercourses. Pollutants may affect the conditions for the aquatic ecology to thrive.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Chocking up of watercourses, a loss of land capability.</li> <li>The loss of fertile soil will result in the loss of important micro ecosystems.</li> </ul>	Construction & Operational	4	1	6	5	55	Control	4	1	6	3	33
19. Opencast mining excavations		Micro-ecosystems			4	2	8	5	70		4	1	6	3	33
21. RoM & product stockpiling		Loss of fertile soil			4	1	8	5	65		4	1	6	4	44
		Micro-ecosystems			4	1	8	5	65		4	1	6	4	44
22. Residue stockpiles		Loss of fertile soil			4	1	8	5	65		4	1	6	4	44
		Micro-ecosystems			4	1	8	5	65		4	1	6	4	44
24. Discard disposal (backfilling of mining area)		Loss of fertile soil			5	1	8	5	70		4	1	4	4	36
		Micro-ecosystems			5	1	8	5	70		4	1	4	4	36



27. River crossings		Loss of fertile soil			4	1	8	5	65		4	1	4	4	36
		Micro-ecosystems			4	1	8	5	65		4	1	4	4	36
30. Vehicular activity on haul roads; and operation of mining equipment		Loss of fertile soil			4	1	8	5	65		4	1	6	3	33
		Micro-ecosystems			4	1	8	5	65		4	1	6	3	33
32. Water Management		Loss of fertile soil			4	1	8	5	65		4	1	4	4	36
		Micro-ecosystems			4	1	8	5	65		4	1	4	4	36
33. Rehabilitation of mining areas		Loss of fertile soil			5	1	8	5	70		4	1	4	4	36
		Micro-ecosystems			5	1	8	5	70		4	1	4	4	36
25. Waste generation, storage and disposal	Illegal dumping	Soil Contamination	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Dumping of generated water in areas other than is approved by the authorisation or EMPr poses a high risk of polluting numerous sources i.e. Water and soil.</li> <li>The dumping of general waste poses a choking risk to grazing animals.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water as well as soil resources.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>This may lead to the degradation of conditions for the aquatic ecology to thrive.</li> <li>Hazardous Leachates from illegal dumps also poses a risk to the health of surrounding communities.</li> </ul>	Construction & Operational	5	2	8	5	75	Control	4	1	4	3	27



Terrestrial Ecology															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Vegetation and habitat loss	Macro and Micro organisms	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Clearing the area to construct the access roads or the servitude leads to the loss of vegetation and habitat for fauna and flora (macro and micro-organisms)</li> <li>Improper rehabilitation measures implemented poses a risk of vegetation and habitat loss..</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>The loss of vegetation will affects the surrounding Fauna and Flora by creating an ecological vacuum over the cleared areas (increasing grazing and habitat utilisation outside of the area).</li> <li>As there is no vegetation the soil will be exposed to wind and water and thus the air quality and water quality will be affected through an increase of dust and sediment load in the runoff.</li> <li>The conditions for macro and micro organisms need to be suitable for reinstatement of the ecosystem.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of biodiversity,</li> <li>Loss of soil through weathering and erosion, increase of air pollution to extensively exposed soil surfaces, choking up of water courses and drainage lines through an increase of sediment in them, due to a lack of vegetation to stabilise the soil.</li> </ul>	Construction & Operational	4	1	6	5	55	Remedy	4	1	4	5	45
		Fauna and Flora			4	1	6	5	55		4	1	4	5	45
19. Opencast mining excavations		Macro and Micro organisms			5	1	8	5	70		4	1	6	4	44
Fauna and Flora		5			1	8	5	70	4		1	6	4	44	
21. RoM & product stockpiling		Macro and Micro organisms			5	1	8	5	70		4	1	6	5	55
		Fauna and Flora			5	1	8	5	70		4	1	6	5	55
22. Residue stockpiles		Macro and Micro organisms			5	1	8	5	70		4	1	6	5	55
		Fauna and Flora			5	1	8	5	70		4	1	6	5	55
33. Rehabilitation of mining areas		Macro and Micro organisms			5	1	10	5	80		1	1	4	5	30
		Fauna and Flora			5	1	10	5	80		1	1	4	5	30



18. Topsoil and subsoil stripping & stockpiling for mining operation area	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Un-vegetated surfaces are prone to an influx of alien invasive vegetation as the area has been disturbed and alien invasive vegetation act as pioneers and thus thrive under such conditions.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Increase of alien vegetation causes and increase of an alien vegetation seed bank in the soil, causing an accumulation of alien invasive species, thus a lack of habitat for indigenous vegetation to establish.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat and biodiversity</li> </ul>	Construction & Operational	4	2	6	5	60	Control	4	2	4	5	50	
19. Opencast mining excavations					4	2	6	5	60		4	1	4	5	45	
21. RoM & product stockpiling					4	2	6	5	60		4	1	4	5	45	
22. Residue stockpiles					4	2	6	5	60		4	1	4	5	45	
33. Rehabilitation of mining areas					4	2	6	5	60		1	1	4	5	30	
29. Storage of fuel and lubricants in temporary facilities	Chemical Fires	Loss of ecosystems	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The improper storage of hazardous substances poses a risk of chemical fires. In the event of a chemical fire the impact to the surrounding environment is significant.</li> <li>If humans are exposed to the fire it will cause damage to their skin and limbs.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of finances and assets of people or companies that have had their valuables burned,</li> <li>Damage to human health and potentially death (long term and short term)</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Loss of lives, loss of ecosystems and increase of poverty of people who have lost valuables in the fire.</li> </ul>	Construction & Operational	5	1	1	0	5	80	Avoid	1	1	6	2	16





**Noise Generation**

Noise Generation															
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Noise generation	Surrounding noise quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The use of construction equipment during site clearing and topsoil stripping may cause noise during the construction phase. If equipment are not maintained and serviced regularly high levels of noise may result throughout the construction and operational phase.</li> <li>The use of drill Riggs and blasting activities itself will result in the generation of noise.</li> <li>Increased noise levels at potentially sensitive receptors which exceeding the criteria for Noise Control Regulations legislation (NCR) and SANS guidelines.</li> <li>Changing ambient sound levels could change the acceptable land use capability.</li> <li>Changing ambient sound levels could increase annoyance and potential complaints.</li> <li>Disturbing character of sound.</li> </ul> <p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>Annoyance of the local community</li> <li>If vehicles are not maintained and serviced regularly high levels of noise may result throughout the construction and operational phase.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of hearing from people in the area as a result of long term noise</li> </ul>	Construction & Operational	Control	4	1	6	5	55	4	1	6	4	44
19. Opencast mining excavations						4	2	6	5	60	4	1	4	5	45
20. Drilling & Blasting						4	2	6	5	60	4	2	4	5	50
21. RoM & product stockpiling						4	2	4	5	50	4	1	2	5	35
22. Residue stockpiles						4	2	4	5	50	4	1	2	5	35
23. Screening Operations						4	1	6	5	55	4	1	4	5	45
24. Discard disposal (backfilling of mining area)						3	2	6	5	55	1	1	4	5	30
30. Vehicular activity on haul roads; and operation of mining equipment						4	2	6	5	60	4	1	4	5	45
33. Rehabilitation of mining areas						2	2	6	5	50	1	1	4	5	30



**Socio-Economic**

Socio-Economic															
17. Employment of workers	Loss of farm labour	Socio-economic	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Increased demand of labour force poses a risk of the local farmers losing farm labour due to competing financial income.</li> <li>Increased demand for labour force poses a risk of a population influx in the local district municipality.</li> <li>The increasing population will put pressure on the local municipality to provide services such as sewage, drinking water, waste management, electricity etc.</li> <li>Increase conflict as a result of the Increased demand for jobs and not enough jobs for everyone,</li> <li>Increase consumption of alcohol, as people do not have anything to do which will also cause an increased conflict.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Reduction of crop production in the area.</li> <li>Increased poverty as too few jobs for the number of people in the area, due to the influx, and deterioration in human health as a result of poor service delivery.</li> <li>Increased poverty, too few jobs for the number of people in the area and thus a deterioration in human health as a result of poor service delivery and poor nutrition.</li> <li>Conflict with the project</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Reduction in food supply</li> <li>Increased crime and sickness</li> <li>Decrease productivity in the area and loss of income as the project and development will close down or not be completed.</li> </ul>	Construction & Operational	4	3	4	5	55	Control	4	2	0	4	24
	Population Influx – Pressure on Resources			Construction & Operational	4	2	4	5	50	Control	4	2	0	5	30
	Population Influx – Social Pathologies			Construction & Operational	4	2	4	4	40	Control	4	2	0	4	24
	Population Influx – Community Conflict			Construction & Operational	4	3	6	5	65	Control	4	2	0	4	24
	Job Creation and Skills Training			Construction & Operational	4	1	0	5	25	Control	4	1	0	5	25



	Job Creation (Multiplier Effect) and Population Influx		<p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Upliftment of local businesses and households</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Upliftment of the local economy and improvement of human life in the area.</li> </ul>	Construction & Operational	4	2	0	5	30	Control	4	2	0	4	24	
20. Drilling & Blasting	Damage to surrounding landowner properties	Socio-economic	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Blasting outside the safe zones or in areas within close proximity to properties of landowners poses a risk of damaging properties.</li> <li>Fly rock poses a human health and safety risk.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Investigations into incident related to damage of landowners property is time consuming and may cause a delay in production.</li> <li>Costly investigations and report generation.</li> <li>Pose a high risk of compensation claims from surrounding communities and landowners.</li> </ul>	Construction & Operational	5	2	6	5	65	Avoid	4	2	6	3	36	
29. Storage of fuel and lubricants in temporary facilities	Chemical Fires	Damage to properties of surrounding landowners	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The improper storage of hazardous substances poses a risk of chemical fires. In the event of a chemical fire the impact to the surrounding environment is significant.</li> <li>If humans are exposed to the fire it will cause damage to their skin and limbs.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of finances and assets of people or companies that have had their valuables burned,</li> <li>Damage to human health and potentially death (long term and short term)</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Loss of lives, loss of ecosystems and increase of poverty of people who have lost valuables in the fire.</li> </ul>	Construction & Operational	1	1	1	0	5	60	Avoid	1	1	10	2	24
31. Bulk transporting of Ore to market on Public roads	Pressure on public transport infrastructure	Socio-economic	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Influx of bulk transporting vehicles puts pressure on the public transport infrastructure.</li> <li>During the life cycle of the proposed activity an increase in vehicle movement in the area will be expected.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>This poses a potential increase in vehicle, pedestrian, and livestock accidents.</li> </ul>	Construction & Operational	4	3	6	5	65	Control	4	2	4	5	50	



**Heritage and Cultural Resources**

18. Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of graves	Loss of heritage resources	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Proposed activities are in close proximity to identified graves thus there is a possibility of destroying features of cultural and heritage importance.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of heritage and history for the future generation of the affected community</li> </ul>	Construction & Operational	5	2	6	5	65	Avoid	5	2	2	4	36
	Degradation of cultural significance heritage sites				5	2	6	5	65		5	2	2	4	36

**Decommissioning Phase**

**Air Quality**

35. Demolition / removal of portable and related infrastructure	Dust generation	Air Quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Dismantling and demolition of existing infrastructure, transporting and handling of topsoil on unpaved roads in order to bring the site to state suitable for alternative land uses poses potential impacts on the atmospheric environment.</li> <li>Demolition and removal of all infrastructure will cause fugitive dust emissions. Any implication this activity will have on ambient air quality will be short-term and localised.</li> <li>Transportation of mobile plants / equipment and other materials from site can lead to the generation of fugitive dust comprising TSP, PM10 and PM2.5. This activity will be short-term, localised, and will have low impacts on the atmospheric environment once the demolition ceases.</li> <li>Re-vegetation of the remaining footprint of the mine must be done after the reclamation.</li> <li>The impacts on the atmospheric environment during rehabilitation will be limited to the vehicular activity, spreading of soil and profiling/contouring.</li> <li>The impact will be medium-term, very limited on spatial scale, with limited implication on ambient air quality.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Continuous exposure to high levels of dust fallout may lead to unhealthy environment for employees and surrounding communities.</li> <li>High levels of dust fallout will affect the overall air quality.</li> <li>The generation of dust during these activities will affect the visual environment negatively.</li> <li>Visibility will be altered as a result of the dust</li> <li>Vegetation pores will be blocked as a result of the dust, slowing down the repertory function of plants</li> <li>Complaints from the community of repertory impacts, such as asthma and</li> </ul>	Decommissioning	2	2	6	5	50	Control	1	1	4	5	30
36. Vehicular activity: removal of mobile plant / equipment and vehicles					1	2	6	5	45		1	1	4	5	30
37. Rehabilitation of the lay down areas					2	2	6	5	50		1	1	4	5	30
38. Demolition of Sedimentation Ponds					1	1	6	5	40		1	1	2	5	20
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					1	1	6	5	40		1	1	4	5	30



			allergies.															
			<p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>• Illnesses such as respiratory and sinus infections in humans.</li> <li>• Flora recruitment will slow down as the vegetation will be stress with blocked pores</li> </ul>															
36. Vehicular activity: removal of mobile plant / equipment and vehicles	CO <sub>2</sub> emissions	Air Quality	<p><b>Direct/Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>• The use of diesel operated construction equipment will cause a contributing factor the BCR Minerals (Pty) Ltd carbon footprint.</li> <li>• Haul vehicles will cause a contributing factor the BCR Minerals (Pty) Ltd carbon footprint.</li> </ul>	Decommissioning	1	1	6	5	40	Control	1	1	2	5	20			
<b>Human Health and Safety</b>																		
35. Demolition / removal of portable and related infrastructure			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>• Dismantling and demolition of existing infrastructure, transporting and handling of topsoil on unpaved roads in order to bring the site to state suitable for alternative land uses poses potential impacts on the atmospheric environment.</li> <li>• Demolition and removal of all infrastructure will cause fugitive dust emissions. Any implication this activity will have on ambient air quality will be short-term and localised.</li> <li>• Transportation of mobile plants / equipment and other materials from site can lead to the generation of fugitive dust comprising TSP, PM10 and PM2.5. This activity will be short-term, localised, and will have low impacts on the atmospheric environment once the demolition ceases.</li> <li>• Re-vegetation of the remaining footprint of the mine must be done after the reclamation.</li> <li>• The impacts on the atmospheric environment during rehabilitation will be limited to the vehicular activity, spreading of soil and profiling/contouring.</li> <li>• The impact will be medium-term, very limited on spatial scale, with limited implication on ambient air quality.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>• Continuous exposure to high levels of dust fallout may lead to unhealthy environment for employees and surrounding communities.</li> <li>• High levels of dust fallout will affect the overall air quality.</li> <li>• The generation of dust during these activities will affect the visual environment negatively.</li> <li>• Visibility will be altered as a result of the dust</li> <li>• Vegetation pores will be blocked as a result of the dust, slowing down the</li> </ul>	Decommissioning	2	2	6	5	50	Control	1	1	4	5	30			
36. Vehicular activity: removal of mobile plant / equipment and vehicles					1	2	6	5	45		1	1	4	5	30			
37. Rehabilitation of the lay down, stockpile and mining areas	Dust generation	Human Health			2	2	6	5	50		1	1	4	5	30			
38. Demolition of Sedimentation Ponds					1	1	6	5	40		1	1	2	5	20			
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					1	1	6	5	40		1	1	4	5	30			



			<ul style="list-style-type: none"> <li>• repertory function of plants</li> <li>• Complaints from the community of repertory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>• Illnesses such as respiratory and sinus infections in humans.</li> <li>• Flora recruitment will slow down as the vegetation will be stress with blocked pores</li> </ul>												
<b>Topography and Visual Environment</b>															
35. Demolition / removal of portable and related infrastructure	Dust generation	Topography and Visual Environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>• Dismantling and demolition of existing infrastructure, transporting and handling of topsoil on unpaved roads in order to bring the site to state suitable for alternative land uses poses potential impacts on the atmospheric environment.</li> <li>• Demolition and removal of all infrastructure will cause fugitive dust emissions. Any implication this activity will have on ambient air quality will be short-term and localised.</li> <li>• Transportation of mobile plants / equipment and other materials from site can lead to the generation of fugitive dust comprising TSP, PM10 and PM2.5. This activity will be short-term, localised, and will have low impacts on the atmospheric environment once the demolition ceases.</li> <li>• Re-vegetation of the remaining footprint of the mine must be done after the reclamation.</li> <li>• The impacts on the atmospheric environment during rehabilitation will be limited to the vehicular activity, spreading of soil and profiling/contouring.</li> <li>• The impact will be medium-term, very limited on spatial scale, with limited implication on ambient air quality.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>• Continuous exposure to high levels of dust fallout may lead to unhealthy environment for employees and surrounding communities.</li> <li>• High levels of dust fallout will affect the overall air quality.</li> <li>• The generation of dust during these activities will affect the visual environment negatively.</li> <li>• Visibility will be altered as a result of the dust</li> <li>• Vegetation pores will be blocked as a result of the dust, slowing down the repertory function of plants</li> </ul>	Decommissioning	Control	2	2	6	5	50	1	1	4	5	30
36. Vehicular activity: removal of mobile plant / equipment and vehicles						1	2	6	5	45	1	1	4	5	30
37. Rehabilitation of the lay down, stockpile and mining areas						2	2	4	5	40	1	1	4	5	30
38. Demolition of Sedimentation Ponds						1	1	6	5	40	1	1	2	5	20



39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.			<ul style="list-style-type: none"> <li>Complaints from the community of repertory impacts, such as asthma and allergies.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Illnesses such as respiratory and sinus infections in humans.</li> <li>Flora recruitment will slow down as the vegetation will be stress with blocked pores</li> </ul>		1	1	6	5	40	1	1	4	5	30
35. Demolition / removal of portable and related infrastructure					2	2	6	5	50	1	1	6	3	24
38. Demolition of Sedimentation Ponds	General waste generation & Littering	Topography and Visual Environment	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the decommissioning phase of the project large amounts of waste (general and hazardous waste) will be generated putting strain on local landfill sites.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or bunded poses a risk of forming potentially hazardous leachates.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water resources.</li> <li>This may lead to the degradation of conditions for the aquatic ecology to thrive.</li> <li>Pressure on the local or national landfills poses the risk of land degradation and requires more space in terms of the IDP of the local municipality.</li> </ul>	Decommissioning	1	1	6	5	40	1	1	4	3	18
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					1	1	8	5	50	1	1	4	5	30



**Surface Water Quality**

Surface Water Quality															
35. Demolition / removal of portable and related infrastructure	Hydrocarbon Contamination	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The potential impact will arise during demolition of infrastructure, where mobilisation of contaminants such as fuels containing hydrocarbons, waste, explosives, PCD material to the surface water resources resulting in the contamination of those resources.</li> <li>Heavy vehicle activity used during the decommissioning phase is poses a risk of leaking or spilling contaminants such as fuels containing hydrocarbons, waste, explosives, PCD material to the surface water resources resulting in the contamination of those resources.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>If the effluent are not treated or disposed off at a registered facility, the leakage or spillage of the contaminated water may lead to the degradation of water and soil resources.</li> <li>Workshop floors, waste storage facilities and fuel storage facilities are exposed to hydrocarbons throughout construction, operation, and decommissioning.</li> <li>Improper disposal method or remediation poses a risk of polluting the surrounding water and soil resources.</li> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>	Decommissioning	Control	2	2	8	5	60	1	1	6	3	24
36. Vehicular activity: removal of mobile plant / equipment and vehicles						2	1	8	5	55	1	1	6	3	24
38. Demolition of Sedimentation Ponds						1	2	8	5	55	1	1	6	3	24
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.						3	1	8	5	60	1	1	6	3	24





35. Demolition / removal of portable and related infrastructure	General waste generation & Littering	Surface Water quality due to leachates	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the decommissioning phase of the project large amounts of waste (general and hazardous waste) will be generated putting strain on local landfill sites.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or bunded poses a risk of forming potentially hazardous leachates.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water resources.</li> <li>This may lead to the degradation of conditions for the aquatic ecology to thrive.</li> <li>Pressure on the local or national landfills poses the risk of land degradation and requires more space in terms of the IDP of the local municipality.</li> </ul>	Decommissioning	3	2	8	5	65	Control	1	1	6	3	24
38. Demolition of Sedimentation Ponds					3	1	8	5	60		1	1	4	3	18
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					3	2	8	5	65		1	1	6	3	24
36. Vehicular activity: removal of mobile plant / equipment and vehicles	Sedimentation and siltation of watercourses	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> <li>Stockpiling excavated material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>	Decommissioning	1	1	8	5	50	Control	1	1	4	4	24
37. Rehabilitation of the lay down, stockpile and mining areas					3	2	8	5	65		1	1	4	3	18



38. Demolition of Sedimentation Ponds	Contamination of water resources	Surface Water quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Discharge, spills and leakage of effluent containing pollutants poses a risk of contaminating water resources within close proximity.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Pollutants pose a risk in altering the conditions of the aquatic ecology to thrive. Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> <li>The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.</li> <li>Sub-surface material and ore exposed to weathering may release pollutants to the water resources</li> <li>Alteration to the conditions of the water resources may negatively affect the aquatic ecology.</li> </ul>	Decommissioning	2	2	8	5	60	32
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.			<p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> <li>When this water reaches surface water bodies or the groundwater it can negatively affect the water quality.</li> </ul>		3	2	8	5	65	24
<b>Ground Water Quality</b>										
35. Demolition / removal of portable and related infrastructure	Hydrocarbon Contamination	Groundwater quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The potential impact will arise during demolition of infrastructure, where mobilisation of contaminants such as fuels containing hydrocarbons, waste, explosives, PCD material to the surface water resources resulting in the contamination of those resources.</li> <li>Heavy vehicle activity used during the decommissioning phase is poses a risk of leaking or spilling contaminants such as fuels containing hydrocarbons, waste, explosives, PCD material to the surface water resources resulting in the contamination of those resources.</li> </ul>	Decommissioning	2	2	8	5	60	8
36. Vehicular activity: removal of mobile plant / equipment and vehicles			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>If the effluent are not treated or disposed off at a registered facility, the leakage or spillage of the contaminated water may lead to the degradation of water and</li> </ul>		2	1	8	5	55	8



38. Demolition of Sedimentation Ponds			<p>soil resources.</p> <ul style="list-style-type: none"> <li>Workshop floors, waste storage facilities and fuel storage facilities are exposed to hydrocarbons throughout construction, operation, and decommissioning.</li> <li>Improper disposal method or remediation poses a risk of polluting the surrounding water and soil resources.</li> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul>		<table border="1"> <tr> <td>1</td> <td>2</td> <td>8</td> <td>5</td> <td>55</td> </tr> </table>	1	2	8	5	55		<table border="1"> <tr> <td>1</td> <td>1</td> <td>6</td> <td>1</td> <td>8</td> </tr> </table>	1	1	6	1	8
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39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.			<p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>The water resource will be contaminated and unfit for use.</li> <li>The soil will be free from organisms and the growth medium for vegetation establishment will be destroyed, vegetation recruitment will be poor.</li> </ul>		<table border="1"> <tr> <td>3</td> <td>1</td> <td>8</td> <td>5</td> <td>60</td> </tr> </table>	3	1	8	5	60		<table border="1"> <tr> <td>1</td> <td>1</td> <td>6</td> <td>2</td> <td>16</td> </tr> </table>	1	1	6	2	16
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38. Demolition of Sedimentation Ponds			<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Discharge, spills and leakage of effluent containing pollutants poses a risk of contaminating water resources within close proximity.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Pollutants pose a risk in altering the conditions of the aquatic ecology to thrive. Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> <li>The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.</li> <li>Sub-surface material and ore exposed to weathering may release pollutants to the water resources</li> <li>Alteration to the conditions of the water resources may negatively affect the aquatic ecology.</li> </ul>		<table border="1"> <tr> <td>2</td> <td>2</td> <td>8</td> <td>5</td> <td>60</td> </tr> </table>	2	2	8	5	60		<table border="1"> <tr> <td>1</td> <td>1</td> <td>6</td> <td>2</td> <td>16</td> </tr> </table>	1	1	6	2	16
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39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Contamination of water resources	Groundwater quality	<p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> <li>When this water reaches surface water bodies or the groundwater it can negatively affect the water quality.</li> </ul>	Decommissioning	<table border="1"> <tr> <td>3</td> <td>2</td> <td>8</td> <td>5</td> <td>65</td> </tr> </table>	3	2	8	5	65	Avoid	<table border="1"> <tr> <td>1</td> <td>1</td> <td>6</td> <td>2</td> <td>16</td> </tr> </table>	1	1	6	2	16
3	2	8	5	65													
1	1	6	2	16													



**Wetland and Aquatic Ecology**

Wetland and Aquatic Ecology															
36. Vehicular activity: removal of mobile plant / equipment and vehicles	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> <li>Stockpiling excavated material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>	Decommissioning	1	1	8	5	50	Control	1	1	4	4	24
					3	2	8	5	65		1	1	4	3	18
37. Rehabilitation of the lay down, stockpile and mining areas	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Constructing access roads and servitudes through drainage lines may cause sedimentation and siltation of watercourses if not managed.</li> <li>Areas stripped of vegetation exposes the ground surface to storm water.</li> <li>Improper installed storm water management features or infrastructure not protected from erosion poses an increase in sedimentation.</li> <li>When uncovered, material being transported may spill increasing the sediment load on watercourses within close proximity.</li> <li>Stockpiling excavated material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Storm water runoff from dirt roads and exposed land or servitudes may cause sedimentation and siltation of nearby watercourses.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat for aquatic species as the river will become silted up.</li> <li>Less availability to water for surface uses as islands and soil banks will be formed while choking the system,</li> <li>Species that require water with a lower sediment load will go extinct in the system.</li> </ul>	Decommissioning	2	2	8	5	60	Avoid	1	1	6	4	32
					2	2	8	5	60		1	1	6	4	32
38. Demolition of Sedimentation Ponds	Contamination of water resources	Wetlands and Aquatic Ecology Wetlands and Aquatic Ecology	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Discharge, spills and leakage of effluent containing pollutants poses a risk of contaminating water resources within close proximity.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Pollutants pose a risk in altering the conditions of the aquatic ecology to thrive. Over an extended period of time the exposure to contamination will cause the degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.</li> <li>The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.</li> <li>Sub-surface material and ore exposed to weathering may release pollutants to the water resources</li> <li>Alteration to the conditions of the water resources may negatively affect the aquatic ecology.</li> </ul>	Decommissioning	2	2	8	5	60	Avoid	1	1	6	4	32
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					2	2	8	5	60		1	1	6	4	32



				<p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Aquatic life will be lost and extinction of species can accrue in the system,</li> <li>Water quality will no longer be fit for animal or human consumption and;</li> <li>Deteriorate water in the downstream catchment.</li> <li>When this water reaches surface water bodies or the groundwater it can negatively affect the water quality.</li> </ul>					<table border="1"> <tr> <td>3</td> <td>2</td> <td>8</td> <td>5</td> <td>65</td> <td></td> </tr> <tr> <td>1</td> <td>1</td> <td>6</td> <td>3</td> <td>24</td> <td></td> </tr> </table>					3	2	8	5	65		1	1	6	3	24	
3	2	8	5	65																					
1	1	6	3	24																					
<b>Soil Quality</b>																									
35. Demolition / removal of portable and related infrastructure	Hydrocarbon Contamination	Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The potential impact will arise during demolition of infrastructure, where mobilisation of contaminants such as fuels containing hydrocarbons, waste, explosives, PCD material to the surface water resources resulting in the contamination of those resources.</li> <li>Heavy vehicle activity used during the decommissioning phase is poses a risk of leaking or spilling contaminants such as fuels containing hydrocarbons, waste, explosives, PCD material to the surface water resources resulting in the contamination of those resources.</li> </ul>					Decommissioning					Control												
36. Vehicular activity: removal of mobile plant / equipment and vehicles			<p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>If the effluent are not treated or disposed off at a registered facility, the leakage or spillage of the contaminated water may lead to the degradation of water and soil resources.</li> <li>Workshop floors, waste storage facilities and fuel storage facilities are exposed to hydrocarbons throughout construction, operation, and decommissioning.</li> <li>Improper disposal method or remediation poses a risk of polluting the surrounding water and soil resources.</li> <li>Water quality will deteriorate and any animal or human requiring water from the resource may suffer from health impacts as a result.</li> <li>The organisms that live in the soil will die as a result of the hydrocarbon contamination (through poisoning and suffocation).</li> <li>The fauna and flora living in the soil and the water will be affected.</li> </ul>																						
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35. Demolition / removal of portable and related infrastructure	Degradation of soil resources	Soil quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Poor management of topsoil and subsoil poses a risk to degradation of soil resources.</li> <li>Spills or leaks of effluent may contain possible pollutants that pose a risk of further degradation of soil resources.</li> <li>Workshop floors, waste storage facilities and fuel storage facilities are exposed to hydrocarbons throughout construction, operation, and decommissioning.</li> <li>Improper disposal method or remediation poses a risk of polluting the surrounding water and soil resources.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Degradation of soil resources poses a risk in altering the conditions for micro organisms to thrive in.</li> <li>A loss of the soil will cause a loss of top or fertile soil with a high growth rate, potential reduces the recruitment rate of vegetation and therefore ecological value, reducing soil quality.</li> <li>The Alien invasive seed-bank will establish and out-compete the indigenous vegetation.</li> <li>Improper management of topsoil or fertile soil may cause the loss of flora micro-ecosystems and cause the degradation of soil quality.</li> </ul> <p><b>Cumulative impact:</b></p> <ul style="list-style-type: none"> <li>Reduction of vegetation reduces grazing for animals in the area.</li> <li>Loss of vegetation will also cause exposes soil surfaces which will result in an increase of dust and a increase of erosion and therefore a chocking of water resource.</li> <li>Loss of biodiversity as a result of alien invasive plant contamination therefore a lack of a suitable growth medium.</li> <li>Biodiversity as a result of alien invasive plant contamination.</li> </ul>	Decommissioning	Remedy	5	1	6	5	60	1	1	4	3	18
		Flora micro-ecosystems				5	1	6	5	60	1	1	4	3	18
37. Rehabilitation of the lay down, stockpile and mining areas		Soil quality				5	1	8	5	70	1	1	4	3	18
		Flora micro-ecosystems				5	1	8	5	70	1	1	4	3	18
38. Demolition of Sedimentation Ponds		Soil quality				5	1	8	5	70	1	1	6	3	24
		Flora micro-ecosystems				5	1	8	5	70	1	1	6	3	24
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.		Soil quality				5	1	8	5	70	1	1	4	3	18
		Flora micro-ecosystems				5	2	8	5	75	1	1	4	3	18



35. Demolition / removal of portable and related infrastructure	Erosion	Loss of fertile soil	<p><b>Direct Impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of soil and growth medium for plants.</li> <li>Un-vegetated areas exposed to weathering for an extended period of time will lead to erosion. Erosion prone areas have a high risk of losing fertile soil caused by flash floods.</li> <li>Improper installation of river crossing infrastructure poses the risk of contributing to the conditions causing erosion i.e. Un-vegetated and exposed river/watercourse banks.</li> </ul> <p><b>Indirect Impact:</b></p> <ul style="list-style-type: none"> <li>Improper management of storm water may lead to erosion along the access routes, drainage lines and low areas.</li> <li>This may lead to the loss of fertile soil and in turn affect the micro-ecosystems of the surrounding environment.</li> <li>The water resources will also be contaminated as a result of the movements of soil with runoff.</li> <li>Erosion poses a risk of contributing to sedimentation and siltation of rivers/watercourses. Pollutants may affect the conditions for the aquatic ecology to thrive.</li> </ul> <p><b>Cumulative Impacts:</b></p> <ul style="list-style-type: none"> <li>Chocking up of watercourses, a loss of land capability.</li> <li>The loss of fertile soil will result in the loss of important micro ecosystems.</li> </ul>	Decommissioning	Control	5	1	8	5	70	1	1	4	4	24
		Micro-ecosystems				5	1	8	5	70	1	1	4	4	24
36. Vehicular activity: removal of mobile plant / equipment and vehicles	Loss of fertile soil	1				1	8	5	50	1	1	4	4	24	
	Micro-ecosystems	1				1	8	5	50	1	1	4	4	24	
37. Rehabilitation of the lay down, stockpile and mining areas	Loss of fertile soil	3				1	8	5	60	1	1	4	3	18	
	Micro-ecosystems	3				1	8	5	60	1	1	4	3	18	
38. Demolition of Sedimentation Ponds	Loss of fertile soil	3				1	8	5	60	1	1	4	3	18	
	Micro-ecosystems	3				1	8	5	60	1	1	4	3	18	
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Loss of fertile soil	3				1	8	5	60	1	1	4	3	18	
	Micro-ecosystems	3				1	8	5	60	1	1	4	3	18	



35. Demolition / removal of portable and related infrastructure	General waste generation & Littering	Soils quality due to leachates	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Throughout the decommissioning phase of the project large amounts of waste (general and hazardous waste) will be generated putting strain on local landfill sites.</li> <li>The storage of large amounts of waste over an extended time in a area not lined or bunded poses a risk of forming potentially hazardous leachates.</li> </ul> <p><b>Indirect/Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>The hazardous leachate from the waste storage facilities poses a risk of contaminating both surface and sub-surface water resources.</li> <li>This may lead to the degradation of conditions for the aquatic ecology to thrive.</li> <li>Pressure on the local or national landfills poses the risk of land degradation and requires more space in terms of the IDP of the local municipality.</li> </ul>	Decommissioning	5	2	8	5	75	Control	1	1	6	3	24
38. Demolition of Sedimentation Ponds					3	1	8	5	60		1	1	4	3	18
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc					5	1	8	5	70		1	1	6	3	24
<b>Terrestrial Ecology</b>															
37. Rehabilitation of the lay down, stockpile and mining areas	Vegetation and habitat loss	Macro and Micro organisms	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Clearing the area to construct the access roads or the servitude leads to the loss of vegetation and habitat for fauna and flora (macro and micro-organisms)</li> <li>Improper rehabilitation measures implemented poses a risk of vegetation and habitat loss.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>The loss of vegetation will affects the surrounding Fauna and Flora by creating an ecological vacuum over the cleared areas (increasing grazing and habitat utilisation outside of the area).</li> <li>As there is no vegetation the soil will be exposed to wind and water and thus the air quality and water quality will be affected through an increase of dust and sediment load in the runoff.</li> <li>The conditions for macro and micro organisms need to be suitable for reinstatement of the ecosystem.</li> </ul> <p><b>Cumulative impacts:</b></p> <ul style="list-style-type: none"> <li>Loss of biodiversity,</li> <li>Loss of soil through weathering and erosion, increase of air pollution to extensively exposed soil surfaces, choking up of water courses and drainage lines through an increase of sediment in them, due to a lack of vegetation to stabilise the soil.</li> </ul>	Decommissioning Decommissioning	5	1	8	5	70	Remedy	1	1	4	4	24
		Fauna and Flora			4	1	8	5	65		1	1	4	4	24





37. Rehabilitation of the lay down, stockpile and mining areas	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>Un-vegetated surfaces are prone to an influx of alien invasive vegetation as the area has been disturbed and alien invasive vegetation act as pioneers and thus thrive under such conditions.</li> </ul> <p><b>Indirect Impacts:</b></p> <ul style="list-style-type: none"> <li>Increase of alien vegetation causes and increase of an alien vegetation seed bank in the soil, causing an accumulation of alien invasive species, thus a lack of habitat for indigenous vegetation to establish.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of habitat and biodiversity</li> </ul>	Decommissioning	3	1	8	5	60	Control	1	1	4	3	18
<b>Noise Generation</b>															
35. Demolition / removal of portable and related infrastructure	Noise generation	Surrounding noise quality	<p><b>Direct Impact:</b></p> <ul style="list-style-type: none"> <li>The use of construction equipment during site clearing and topsoil stripping may cause noise during the construction phase. If equipment are not maintained and serviced regularly high levels of noise may result throughout the construction and operational phase.</li> <li>The use of drill Riggs and blasting activities itself will result in the generation of noise.</li> <li>Increased noise levels at potentially sensitive receptors which exceeding the criteria for Noise Control Regulations legislation (NCR) and SANS guidelines.</li> <li>Changing ambient sound levels could change the acceptable land use capability.</li> <li>Changing ambient sound levels could increase annoyance and potential complaints.</li> <li>Disturbing character of sound.</li> </ul> <p><b>Indirect impacts:</b></p> <ul style="list-style-type: none"> <li>Annoyance of the local community</li> <li>If vehicles are not maintained and serviced regularly high levels of noise may result throughout the construction and operational phase.</li> </ul> <p><b>Cumulative Impact:</b></p> <ul style="list-style-type: none"> <li>Loss of hearing from people in the area as a result of long term noise</li> </ul>	Decommissioning	1	2	6	5	45	Control	1	1	4	5	30
36. Vehicular activity: removal of mobile plant / equipment and vehicles					1	1	6	5	40		1	1	4	5	30
38. Demolition of Sedimentation Ponds					1	1	4	5	30		1	1	4	5	30
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					1	1	6	5	40		1	1	4	5	30

A detailed Environmental Impact Assessment can be found in **Appendix T**.



#### vi) Methodology used in determining and ranking the impacts and risks

*(Rank the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks. Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)*

The significance (quantification) of potential environmental impacts identified during the Environmental Impact Assessment have been determined using a ranking scale, based on the following (terminology has been taken from the Guideline Documentation on EIA Regulations, of the Department of Environmental Affairs and Tourism, April 1998):

#### Occurrence

- Probability of occurrence (how likely is it that the impact may occur?)
- Duration of occurrence (how long may it last?)

#### Severity

- Magnitude (severity) of impact (will the impact be of high, moderate or low severity?)
- Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?)

Each of these factors has been assessed for each potential impact using the ranking scales represented by Table 12.

*Table 12: Ranking scale of the four factors considered to determine significance rating*

Probability	Duration
1 - very improbable (probably will not happen)	1 - of a very short duration (0–1 years)
2 - improbable (some possibility, but low likelihood)	2 - of a short duration (2-5 years)
3 - probable (distinct possibility)	3 - medium-term (5–15 years)
4 - highly probable (most likely)	4 - long term (> 15 years)
5 - definite (impact will occur regardless of any prevention measures)	5 - permanent
Extent	Magnitude
1 - limited to the site	0 - small and will have no effect on the environment
2 - limited to the local area	2 - minor and will not result in an impact on processes
3 - limited to the region	4 - low and will cause a slight impact on processes
4 - will be national	6 - moderate and will result in processes continuing but in a modified way
5 - will be international	8 - high (processes are altered to the extent that they temporarily cease)
	10 - very high and results in complete destruction of patterns and permanent cessation of processes



The environmental significance of each potential impact is assessed using the following formula:

$$\text{Significance Points (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

The maximum value is 100 Significance Points (SP). Potential environmental impacts were rated as high, moderate or low significance on the following basis:

- < 30 significance points = **LOW** environmental significance.
- 31- 60 significance points = **MODERATE** environmental significance
- 60 significance points = **HIGH** environmental significance



## **vii) Positive and negative impacts of the proposed activity and alternatives on environment and affected communities**

*(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)*

During the initial EIA studies conducted during the application process for a mining right a number of specialist studies were conducted. These findings are also applicable to the waste management activities identified for the purpose of this report.

The following recommendations regarding the current site layout have been made by the specialist reports:

### ***Biodiversity Assessment***

The following could proceed if all mitigation measures are diligently implemented with all the necessary authorisations – including permits for protected species removal:

- The creation of additional internal access roads is discouraged, but it is anticipated that existing tracks will be upgraded and possibly doubled in width
- The sites for the main office and workshop complex as well as stockpiles 1 and 2 already exist from the prospecting phase, but are anticipated to be expanded
- The laydown area for Phase 3 should be restricted to temporary offices and an ore stockpile, together not exceeding 3-4 ha in total and not closer than 50 m (preferably 100 m) from the bank of any riparian area/drainage line

The following is considered ecologically unacceptable and should not proceed:

- Workshops within the Tubatse laydown area, except small storage areas for every-day maintenance of machinery, larger repairs should be done at the existing office complex;
- Phase 3: Spitsvale Flats mining should not be allowed within the erosion plains (about half the area of the mapped ore) – the permanent impacts anticipated there will influence areas beyond the affected land portions and totally seize current landscape functionality (amongst other impacts), which cannot be justified.

### ***Hydrological assessment***

Flooding at the site was investigated but limitations in available site elevation data meant that a reliable flood model (for flood line modelling) could not be built. Instead, a buffer approach (100m) for all non-perennials within the site boundary was adopted. There is a significant amount of infrastructure located within these buffers and intersecting watercourse. These instances will need to be considered during the water use license process (Section 21 c and i). It is recommended that flood lines are modelled (when detailed elevation data becomes available) for streams where flooding of infrastructure are a concern in order to ensure complete compliance with GN704.



Stream crossings and associated bridge and culvert designs have not been considered in this assessment but in principle, these crossing needs to be sufficiently sized to provide capacity to convey the 1:100 year flood event over the expected life of the structure to minimise impacts and ensure that the natural flow regime can be maintained as far as possible.

Wet and dry season static water balances have been developed for the project based on monthly input data from various specialists. Based on the model results, there seems to be an excess of approximately 22 527m<sup>3</sup>/month and 8 065m<sup>3</sup>/month for the wet and dry seasons respectively. This excess water will need to be appropriately managed and if deemed necessary to discharge, meet the appropriate discharge quality guidelines and associated discharge IWULA conditions.

### **Soil Assessment**

In order to provide sufficient topsoil material for rehabilitation purposes and to optimise soil recovery, the following aspects are recommended:

- Stockpiles to be located outside proposed mine disturbance area(s);
- Construction site is confined to demarcated boundaries and buffer zones.
- No transgression is allowed outside the set boundaries and protocol of the set specifications

Loss of agricultural land due to establishment of infrastructure is a long term loss and no mitigation measures exist. Mitigation is restricted to limitation of extent of impact to the immediate area of impact and minimisation of off-site impacts.

As discussed in previous sections, the EAP recommends that this report be revised to include the comments received after the 30 days public participation process as required by GN R. 982. It is expected that comments received after the required PPP that a number of concerns may alter the final site layout of the proposed mining development.

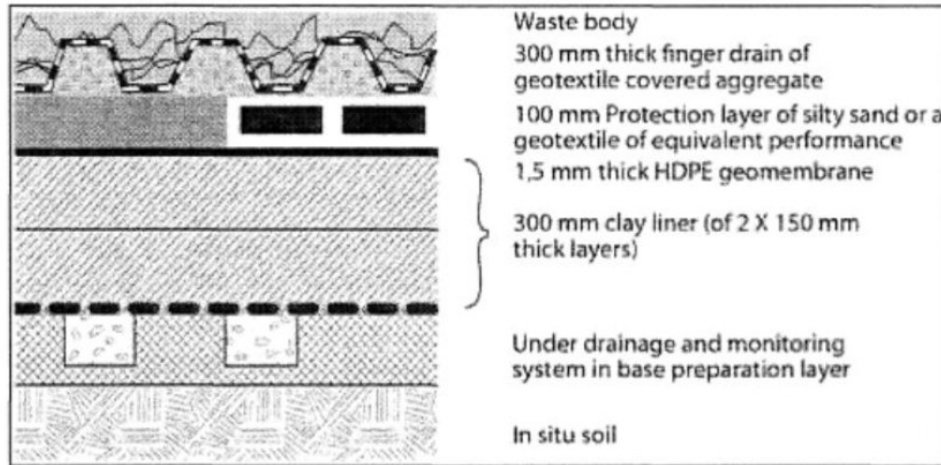
### **Waste Classification**

The residue deposits recorded alkaline pH and low to undetected levels of soluble (mobile) macro- and micro constituents. Given the nature and mineralogy of the Bushveld Complex, the total concentration analyses did reveal some micro constituents to be above detection levels whilst also exceeding TCT0 levels with regards to the Norms and Standards. Micro-elements that exceeded the TCT0 levels include cobalt, copper, manganese, nickel, vanadium and fluoride.

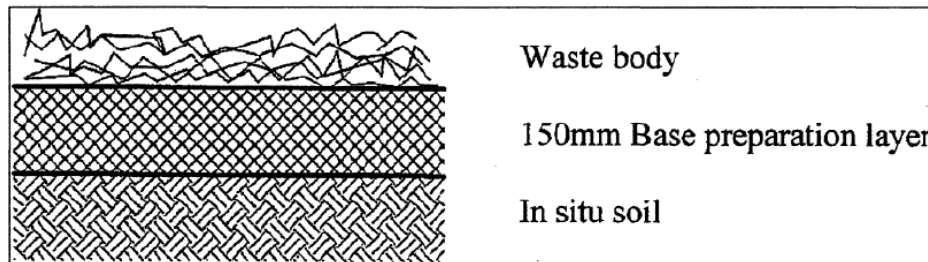
If the Norms and Standards methodology is strictly applied to the WRDs (Waste Rock Deposits), it can neither be classed as Type 3 or a Type 4 waste material. According to the methodology, for a waste material to be classified as Type 4, the LC (leachable concentration) and the TC (total concentration) must be below the LCT0 and TCT0, while for a waste to be classified as Type 3, the LC and TC must be below the LCT1 and TCT1, respectively. However, the following is true for the waste rock:

$$(LC < LCT0 \text{ and } TCT0 < TC < TCT1)$$

Strictly in terms of the National Norms and Standards for Disposal of Waste to Landfill (GN.R. 636) the containment barriers for the WRDs must comply with the minimum engineering design requirements of a Class C Landfill or Class D Landfill as shown below.



**Class C Landfill engineering design.**



**Class D Landfill engineering design**

The BCR WRDs recorded within LCT0 limits, and this together with the fact that the material is non-acid generating, the risk of poor quality leachate developing from the WRDs towards the receiving environment is perceived to be very low. A **Class D Landfill Engineering Design** is therefore proposed.

Refer in addition to Table 13 (section j) to this report) for the list of specialist studies.

**viii) Possible mitigation measures**

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

Part B of this document provides the detailed management plan of each impact and risks. The management plan addresses mitigation measures in detail.



All concerns raised by the I&AP as part of the PPP listed in the previous section will be incorporated and addressed and will form part of the consideration of mitigation measures.

#### **ix) Motivation where no alternative sites were considered**

As discussed in section **g)** of this report, no property alternatives have been considered as the proposed activities will occur on properties forming part of the existing prospecting rights. However a number of alternatives regarding the placement of infrastructure within the property boundaries have been considered throughout this process.

The current site layout (**Appendix C**) has been determined by considering both environmental and social sensitive receptors as well as considering operational feasibility.

#### **x) Statement motivating the alternative development location within the overall site**

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

As discussed in the previous sections, both environmental and social sensitive receptors were considered in the site layout attached as **Appendix C.1**.

In terms of the actual mining areas, there are no alternative sections to be mined as the prospecting results indicated that these areas would be most feasible. A number of the infrastructure has been established during the prospecting phase of the Spitsvale Mine and will be utilised as part of the proposed activities highlighted in this report. The site layout (**Appendix C.1**) clearly indicates existing and “new” infrastructure.

#### **h) Full description of the process undertaken to identify, assess and rank the impacts and risks through the life of the activity**

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

Environmental Management Assistance (Pty) Ltd as the appointed EAP took an <sup>1</sup>Integrated Environmental Management (IEM) approach. However, the adoption of an IEM approach should not be interpreted as an Environmental Impact Assessment (EIA) in its self. It should rather be seen as an underlying philosophy and set of principles, supported by an EIA and management tools that are aimed at promoting sustainability (DEAT, 2004).

Together with the requirements stipulated in GN R. 982 (2014 EIA regulations) the principles set out in the IEM Guideline series published by the Department of Environmental Affairs (DEA, 1992) were considered throughout the assessment process.

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<sup>1</sup> Definition of IEM according to DEAT (2004): *IEM provides a holistic framework that can be embraced by all sectors of society for the assessment and management of environmental impacts and aspects associated with an activity for each stage of the activity life cycle, taking into consideration a broad definition of environment and with the overall aim of promoting sustainable development.*



Table 11 firstly provides a full description of all environmental issues and risks identified during the EIA process. Secondly it provides the assessment of the significance of each issue and risk according to the methodology discussed in section vi) of this report. Lastly, it provides with an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.

The supporting Impact Assessment conducted is attached as **Appendix T** to this report.





**i) Assessment of each identified potentially significant impact and risk**

*(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties)*

In section **v)** of this report, all potential impacts and aspects associated to the Waste Management activity has been identified. Each possible impact have been assessed according to the methodology described in section **vi)**. Pre- and Post- significance ratings were established and are represented in **Table 11**. Each score rating indicates the significance of the potential impacts and risks and is colour coded according to **Table 10**.

The supporting impact assessment conducted by the EAP is attached as an appendix, marked **Appendix T**.



**j) Summary of specialist reports**

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

*Table 13: Summary of inclusion of specialist recommendations*

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an <b>X</b> where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
1. <b>Appendix J:</b> Air Quality Impact Assessment	<p>A detailed air quality management plan, using the recommendations provided as a tool, would need to be developed and compiled specifically for the project prior to the commencement of operations.</p> <p>Summary of recommendations and monitoring requirements:</p> <ul style="list-style-type: none"> <li>• A fugitive dust management plan to be developed prior to the commencement of any onsite activities.</li> <li>• Dust control measures need to be assessed in detail and incorporated into the design.</li> </ul>	<b>X</b>	Part B: EMPr



	<ul style="list-style-type: none"> <li>• The plan must include appropriate mitigation measures as described in Table 6-1 for all dust emission sources.</li> <li>• The plan should be implemented once operations commence.</li> <li>• Designated areas for the storage of overburden should be considered and incorporated into the design.</li> <li>• All main hauling roads should be treated for dust suppression to maintain at least 65% emission reduction efficiency.</li> <li>• Regular cleaning and maintenance of hauling routes.</li> <li>• Immediate clean-up of any spillage.</li> <li>• All material that is being transported should be covered during transport (where possible).</li> <li>• Control the number of trucks on the road, weight of trucks and the travelling speed.</li> <li>• Conduct regular maintenance and checks for haul road surfaces.</li> <li>• Implement strict vehicle speed limits.</li> <li>• Conduct regular maintenance and quality checks (engines/tires) for all heavy mobile equipment/trucks.</li> <li>• Consider use of cleaner fuel types and fuel efficient vehicles/mobile equipment/trucks.</li> </ul>		
<p><b>2. Appendix L:</b> Biodiversity Impact Assessment</p>	<p>From a terrestrial ecological perspective, the proposed development has been rated as follows:</p>	<p><b>X</b></p>	<p>Part A: consideration for final site layout Part B: EMPr</p>



<p>(Terrestrial Ecology)</p>	<p>The following could proceed if all mitigation measure are diligently implemented with all the necessary authorisations – including permits for protected species removal:</p> <ul style="list-style-type: none"> <li>• The creation of additional internal access roads is discouraged, but it is anticipated that existing tracks will be upgraded and possibly doubled in width</li> <li>• Phase 1: Klarinet Koppie mining near the discontinued Clarinet Mine could proceed</li> <li>• Phase 3: Tubatse Koppie mining could proceed but with caution</li> <li>• The sites for the main office and workshop complex as well as stockpiles 1 and 2 already exist from the prospecting phase, but are anticipated to be expanded</li> <li>• The laydown area for Phase 3 should be restricted to temporary offices and an ore stockpile, together not exceeding 3-4 ha in total and not closer than 50 m (preferably 100 m) from the bank of any riparian area/drainage line</li> </ul> <p>The following is considered ecologically unacceptable and should not proceed:</p> <ul style="list-style-type: none"> <li>• Workshops within the Tubatse laydown area, except small storage areas for every-day maintenance of machinery, larger repairs should be done at the existing office complex</li> <li>• Phase 3: Spitsvale Flats mining should not be allowed within the erosion plains (about half the area of the mapped ore) – the permanent impacts anticipated there will influence areas beyond the affected land portions and totally seize current landscape functionality (amongst other impacts), which cannot be</li> </ul>		
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	justified.		
3. <b>Appendix M:</b> Avifauna Survey and Impact Assessment	<p>The only real mitigation would be to limit the area of the above-ground development (and its impacts) as far as is possible. These measures would include:</p> <ul style="list-style-type: none"> <li>• To leave, as far as is possible, as much of the natural indigenous bush undisturbed and in its pristine state.</li> <li>• Route connecting roads as close as is possible to already developed sites or roads.</li> <li>• Restrict or prohibit any off-road driving in areas of pristine indigenous bush.</li> <li>• Route powerlines along these connecting roads, or better still, route them underground.</li> </ul>	X	Part B: EMPr
4. <b>Appendix N:</b> Bat Survey	<p>The focus for mitigation measures in relation to vegetation removal/habitat degradation would be:</p> <ul style="list-style-type: none"> <li>• Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely necessary.</li> <li>• Discourage vehicles from driving through the natural vegetation where mining activities are not taking place.</li> </ul>	X	Part B: EMPr



	<ul style="list-style-type: none"> <li>• Prohibit mining plant and trucks from washing or dumping material near a water course (wet or dry) to prevent the pollution of natural water bodies.</li> <li>• Prohibit any chemical and/or heavy metal from being released into the environment.</li> <li>• Manage all waste water and stormwater to prevent pollution to water bodies.</li> </ul> <p>The focus for mitigation measures in relation to light and noise pollution would be;</p> <ul style="list-style-type: none"> <li>• To erect security lights/spot lights only near infrastructure/where absolutely necessary.</li> <li>• Mitigate night time noise to as low as possible, particularly during peak foraging times.</li> <li>• Restrict blasting activities to daytime hours.</li> </ul>		
<p><b>5. Appendix P:</b> Geo-hydrological Impact Assessment</p>	<p>The following recommendations are proposed to monitor and minimise potential impacts on the receiving groundwater environment:</p> <ul style="list-style-type: none"> <li>• An environmental monitoring programme should be established in order to monitor groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</li> <li>• A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to fig) to be included into a monthly/quarterly monitoring programme for the BCR Minerals operation.</li> </ul>	<p><b>X</b></p>	<p>Part B: EMPr</p>



	<ul style="list-style-type: none"> <li>• The parameters to be analysed should comprise the following:           <ul style="list-style-type: none"> <li>➤ Physico-chemical parameters (pH, EC, TDS);</li> <li>➤ Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4,);</li> <li>➤ Major cations (K, Na, Mg, Ca, NH4,); and</li> <li>➤ Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI),).</li> </ul> </li> <li>• Emphasis should be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</li> <li>• Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</li> </ul>		
<p><b>6. Appendix G:</b> Hydrological Assessment</p>	<p>The following summarises the recommendations as a result from the Hydrological Assessment:</p> <ul style="list-style-type: none"> <li>• It is recommended that an Automatic Weather Station be installed at the site.</li> <li>• There is a significant amount of infrastructure located within these buffers and intersecting watercourse. These instances will need to be considered during the water use license process (Section 21 c and i). It is recommended that floodlines are modelled (when detailed elevation data becomes available) for streams where flooding of infrastructure is a concern in order to ensure complete compliance with GN704. Peak flows and hydrographs were developed as part of this study for various sub catchments over the site. These outputs are intended to inform any future flood modelling.</li> </ul>	<p><b>X</b></p>	<p>Part A: consideration for final site layout Part B: EMPr</p>



	<ul style="list-style-type: none"><li>• Stream crossings and associated bridge and culvert designs have not been considered in this assessment but in principle, these crossing need to be sufficiently sized to provide capacity to convey the 1:100 year flood event over the expected life of the structure to minimise impacts and ensure that the natural flow regime can be maintained as far as possible.</li><li>• The conceptual storm water management plan has been developed based on the requirements of GN 704. This was done by identifying clean and dirty areas and managing them accordingly. Dirty water producing areas have been isolated by diverting upstream clean water around them via clean water diversions and dirty water produced in dirty areas has been routed to dirty containment facilities via diversions. Stormwater infrastructure has been developed based on the contributing catchment areas and catchment characteristics, and has been sized to contain the 1:50 year flood event. It is recommended that discussions are held with the DWA regarding the lining requirements for storm water management infrastructure, to ensure that the flood hydrology calculations can be revised accordingly during detailed design and prior to construction of infrastructure. The “recommended volumes” of the proposed dirty storm water dams should be investigated further during the detail design phase to accommodate operational storage volumes, without compromising the ability of the dams to contain the “minimum volumes” as per GN 704 compliance. It is recommended that priority is given to the reuse of dirty water within the process water circuit.</li><li>• As part of the monitoring program going forward, samples should be taken monthly for at least the first year of operation. This can be revised to quarterly</li></ul>		
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	<p>monitoring if no concerns are highlighted. This will however need to be discussed with the DWS as they are the ultimate custodians of the water resources. The monitoring should include the standard analysis of major cations/anions as well as ICP scan for metals. Waterlab in Pretoria has appropriate accreditation for such analysis to be undertaken.</p> <ul style="list-style-type: none"> <li>• The WR2012 mean annual estimate of runoff for the site was estimated according to the dirty area contained (comprised of stockpiles, opencast areas and containment facilities) and totalled 1.097km<sup>2</sup>. This accounts for 0.022 million m<sup>3</sup> of MAR that will be contained by the site (0.15% of quaternary catchment B41J MAR)</li> <li>• Based on the model results, there seems to be an excess of approximately 22 527m<sup>3</sup>/month and 8 065m<sup>3</sup>/month for the wet and dry seasons respectively. This excess water will need to be appropriately managed and if deemed necessary to discharge, meet the appropriate discharge quality guidelines and associated discharge IWULA conditions. It is recommended that the water balance be updated once more specific domestic and process water reticulation volumes are known and refined annually during the life of the project. Flow meters should be installed in the domestic and process water circuits to provide actual data on water flows so that the water balance can be updated accordingly. A suitable dynamic water balance simulation model could also be developed and used as a decision support tool as mining progresses.</li> </ul>		
<p><b>7. Appendix R:</b> Heritage Impact</p>	<p>Conditions for inclusion in the environmental authorisation:</p> <ul style="list-style-type: none"> <li>• It is recommended that the homestead sites are retained, and that it should be</li> </ul>	<p><b>X</b></p>	<p>Part A: consideration for final site layout</p>



<p>Assessment</p>	<p>fenced off for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the stone walling/physical features. If the sites cannot be retained, it should be documented (mapped and excavated) by an archaeologist after obtaining a permit from SAHRA (see Appendix 5 for more detail the proposed mitigation for each identified site).</p> <ul style="list-style-type: none"> <li>• If mining takes place in these areas, the community should be consulted to determine if there are any more graves in the region, especially those of young children who, in many cases, are buried inside the old homestead.</li> <li>• It is recommended that the burial sites are retained and it should be fenced off for the duration of the mining activities, leaving a buffer zone of at least five metres from the outer edge of the graves. If the graves cannot be retained, it should be relocated, but only on condition of following the correct procedures (see Appendix 5 for more detail on each identified site).</li> <li>• It is recommended that the industrial/infrastructural heritage feature (irrigation system) should be documented (photographed and mapped) in before mining activities takes place.</li> <li>• Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. According to local inhabitant, Mr Silas Mosethla, old informal burial sites might still be located in some places, but it would be difficult to trace due to “lack of memory” and the current dense vegetation.</li> </ul>		<p>Part B: EMPr</p>
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<p><b>8. Appendix K:</b> Noise Impact Assessment</p>	<p>The most important mitigation options recommended would be to limit operations on the open cast pits adjacent to the Tubatse community to daytimes only (during all phases). Berms/barriers need to be constructed along either the noise sources or the receivers. In order for the berms/barriers to successfully act as an acoustical screen specifications indicated in this document mitigation section must be adhered to. Communicate between the Tubatse community and the developer need to be implemented and maintained, highlighting the outcome of this study.</p> <p>An annual Acoustical Measurement &amp; Audit Programme is recommended to be conducted during the construction and operational phase. Measurements should be collected in 10-minute bins over a 48 hour measurement period. Variables and measurement recommended settings to be analysed include <math>L_{Amin}</math>, <math>L_{Aeq}</math>, <math>L_{AMax}</math>, <math>L_{AMin}</math>, <math>L_{A10}</math>, <math>L_{A90}</math> and spectral analysis. Noise measurements must be continued as long as there are potential receptors living within 1,000m of the boundaries of the mining operation, or as long as a valid noise complaint is registered.</p> <p>Feedback regarding noise measurements should be presented to all stakeholders and other Interested and Affected parties in the area. The feedback platform and interval periods should be defined by the developer, with an annual feedback period recommended. If the layout of the mine changes significantly (or assumptions change) used in this report, that this Environmental Noise Impact Assessment be reviewed with the appropriate information supplied by the developer, including:</p>	<p><b>X</b></p>	<p>Part B: EMPr</p>
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	<ul style="list-style-type: none"> <li>• Locality of the noise source;</li> <li>• Operational time of the noise source; and</li> <li>• If possible specifications regarding the noise source</li> </ul>		
<p><b>9. Appendix O: Soil Impact Assessment</b></p>	<p>The results of the Impact Assessment for the proposed mine on Portions 8, 22 Farm Kennedy's Vale 361KT &amp; Portions 24, 25, 26 and 28 Farm Spitskop 333KT find the proposed activity will have a medium to low impact on the immediate and surrounding soil systems. Implement and management of proposed mitigation measures will minimize loss of topsoil, prevent contamination of topsoil and stockpiled soil and prevent overall soil erosion.</p> <p>It is recommended that the proposed project be approved subjected to the mitigation measures stipulated in the Impact Assessment and Environmental Management Programme</p> <p>The following mitigation measures are recommended to prevent the change of soil's physical, chemical and biological properties due to loss of topsoil:</p> <ul style="list-style-type: none"> <li>• due to erosion, stockpiling, mixing of deep and surface soils during handling, stockpiling and subsequent placement;</li> <li>• Implement live placement of soil where possible, improve organic status of soils, maintain fertility levels and curb topsoil loss.</li> <li>• Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with</li> </ul>	<p><b>X</b></p>	<p>Part B: EMPr</p>



	<p>minimal soil erosion</p> <p>Loss of agricultural land due to establishment of infrastructure is a long term loss and no mitigation measures exist. Mitigation is restricted to limitation of extent of impact to the immediate area of impact and minimisation of site impacts.</p> <p>Loss of agricultural land due to opencast mining is a temporary loss which can be mitigated by appropriate backfilling and replacement of stockpiled topsoil. If done correctly, most of the original agricultural potential will be restored.</p> <p>When stockpiled soils have been replaced during rehabilitation, the soil fertility should be assessed to determine the level of fertilisation required to sustain normal plant growth.</p> <p>The fertility remediation requirements need to be verified at the time of rehabilitation. The topsoil should be uniformly spread onto the rehabilitated areas and care should be taken to minimise compaction that would result in soil loss and poor root penetration.</p> <p>When returning the soil to the rehabilitation site care should be taken to place soil in a manner that will allow for levelling of soil to take place in a single pass.</p> <p>The soil profile should not be built up by using a repeated tipping and levelling action to increase the soil depth.</p>		
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	<p>Proper water control measures should be implemented to ensure a free draining rehabilitated landscape.</p> <p>When surveying the area to be rehabilitated and generating a digital terrain map, preferential seepage pathways should be identified and contoured to prevent surface runoff creating erosion during a 1:100year rainstorm event with 20mm/h rainfall intensity.</p> <p>A soil scientist with remediation and rehabilitation experience should be consulted to assess water retention and storage abilities of soil types to utilise the net cascading effect of water storage under saturated and unsaturated flow conditions.</p> <p>A scientific assessment should be conducted to assess what grass species occur at baseline conditions in close proximity to the stockpile area.</p>		
<p>10. <b>Appendix Q:</b> Human Health Impact Assessment</p>	<p>The baseline assessment of the community's health and wellbeing provides a baseline from which the monitoring programme can judge whether the project or other factors are causing beneficial or harmful effects on local communities (ICMM, 2010). The IFC guidelines suggest that a company's mitigation strategy and health action plan should include both a long term community health monitoring (surveillance) and evaluation plan, as well as a verification programme (IFC, 2009). Such programmes are designed to 1) review progress on the project; 2) provide early warning of population level problems, whether at the single or cumulative effects levels, by identifying problems in planning and/or implement; and 3) make adjustments in order</p>	<p><b>X</b></p>	<p>Part B: EMPr</p>



	<p>to address unanticipated effects. As a result, an M&amp;E programme requires clear key performance indicators in order to capture early unanticipated consequences, to institute remedial actions and to evaluate progress made on the objectives of the Health Action Plan.</p> <p>It will be of value to form a group of different stakeholders that have the potential to be involved in establishing a coordinated data collection process. Inclusion of local government departments such as environment, health and others will help to understand and assist with improving the status of the local health information systems, including the reliability of the data accessibility in a timely manner so that early warnings of population-level issues may be raised. Community organisations should be included and community members could be employed as infopreneurs (an entrepreneur who specialises in information, thereby providing, promoting, and distributing knowledge) (Van Rensburg, 2008). Inclusion of other industries is important in order to avoid duplication of monitoring efforts. Such a group may also be able to provide more frequent informal data, even though it may be more qualitative assessments.</p>		
<p><b>11. Appendix S:</b> Traffic Impact Assessment</p>	<p>The findings of the traffic impact assessment for proposed BCR Chrome Mine, the Spitsvale Mine in Steelpoort conclude that the proposed development will not have a negative impact on the existing road networks within the project area. However, certain mitigation measures have been recommended to accommodate the background traffic demand, Latent Rights and the proposed mine's developed traffic</p>	<p><b>X</b></p>	<p>Part B: EMPr</p>



	<p>and also to ensure traffic safety principles are adhered to.</p> <p>Based on the conclusions of this assessment, it is recommended that the proposed development should be favourably considered from a traffic engineering point of view by the relevant authorities.</p>		
<p>12. <b>Appendix U:</b>          Mine Rehabilitation, closure, and Liability plan</p>	<p>It is assumed that approximately 80 – 100 ha of land will be disturbed during the current exploration and planned mining operations. An assessment was conducted of all the infrastructure and activities taking place on site that fall within the properties associated to the mining right application. The infrastructure was classified in accordance with the tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. A separate calculation was done to include the costs associated with Phase 1 (including laydown area 1, Klarinet Koppie opencast pit and the associated ROM stockpiles). A supplementary calculation was done to incorporate Phase 2 &amp; 3 and a second laydown area. These extensions are planned as part of the next phases of the project and will only commence once phase 1 mining operations have ceased.</p> <p>The premature quantum was calculated using the demolition and rehabilitation rates and has been calculated as <b>R 6 140 648.41(including P&amp;G, contingency and excluding VAT)</b> for the physical and biophysical components associated with the current activities and infrastructure on the site. This related to Open pit 1, Laydown</p>	<p>X</p>	<p>Final EMPr</p>





	<p>area 1, Ore stockpile area, ROM stockpile area and roads.</p> <p>It is evident that the biophysical component of rehabilitation makes for 100% of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of the biophysical component. The physical rehabilitation (demolition and removal of structures) amounts to 0% of the liability cost. For the reason that all infrastructure will either be removed off site by the mining contractor or be taken over by the community. Therefore, the biophysical component contributes solely to the calculated closure costs for premature closure. A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.</p> <p>The quantum calculated for all activities and infrastructure associated with the entire Spitsvale Mine (including mining of phase 2 and 3 and the associated infrastructure) was calculated as <b>R8 699 326.49 (including P&amp;G, contingency and excluding VAT)</b>. The increase in biophysical costs (between the current and proposed costs) can be attributed to the addition of two opencast pits, with their associated infrastructure, in the future. All physical infrastructure to be constructed in the future will also be either removed upon closure by the mining contractor or given to the community.</p>		
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	Allowance has been made for the creation of a free-draining topography, replacement of soil, re-vegetation, and for the general surface rehabilitation of the disturbed area and the liability figures will be updated on an annual basis as required by the DMR.		
13. <b>Appendix I:</b> Public Participation Report	To be finalised after the completion of the required 30 days PPP.	<b>X</b>	Part A of this report

*(Attach copies of Specialist Reports as appendices.)*



### k) Environmental Impact Statement

In accordance with the Appendix 3 section 3 (q) of the EIA Regulations GN R982, the EAP must provide an opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation must be stated.

An impact assessment has been undertaken, which has incorporated extensive consultation with appointed independent specialist, and resulted in this report.

It is the EAP's opinion that due process has been followed in terms of identifying impacts found to be potentially significant. Various mitigation measures to manage and monitor the impacts of the Project have been proposed. **Appendix U** addresses the requirements stipulated in GNR 1147 dealing with the financial provisions for the proposed mining operation as well as commitment to rehabilitation measures that will be implemented once authorisation has been granted.

In Environmental Management Assistance (Pty) Ltd's professional opinion based on information provided by the applicant, all anticipated construction and operational impacts for the proposed Project have been considered. The draft Spitsvale Mine Rehabilitation, closure and liability plan has been completed during the time of finalising this document. However, the Mine Rehabilitation, closure and liability plan is considered to be a living document and is subject to an annual review.

Therefore, in consideration of all facts presented by this final EIR, the proposed activities may only commence with the following conditions:

- The findings and recommendations stipulated in the Spitsvale Mine Rehabilitation, closure, and liability plan (**Appendix U**) be implemented;
- A Annual Rehabilitation Plan be developed and reviewed as per the requirements stipulated by GNR 1147;
- The comments received by the registered I&AP be incorporated into the final EMPr; and
- That the recommended mitigation measures must be strictly implemented and compliance is monitored and reported in order to minimise the impacts and ensuring compliance with current legislative requirements.

It is recommended that the proposed Project is allowed to proceed on the assumption that the environmental and social management commitments are adhered to, the Project description remains as per the description provided in the final EIR & EMPr and considering the positive social impacts associated with the Project.



### i) Summary of the key findings of the EIA

A number of significant impacts associated to the proposed activities have been identified in previous section in this report as part of the EIA process. In the review of the specialist assessment reports highlighted in section *j)* specific environmental and social sensitive receptors were identified. Table 14 summarises the high significant potential impacts associated to the proposed Waste Management activities.

*Table 14: Summary of high significant potential impacts*

Construction Phase			
Activity	Possible Impacts	Significance Pre-mitigation	Significance Post-mitigation
1. Access and hauling along roads i.e. during the construction of roads	Vegetation and habitat loss	65	36
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure	Vegetation and habitat loss	70	36
	Destruction of Wetlands	65	36
	Destruction of graves	65	39
	Degradation of cultural significance heritage sites	65	39
	Erosion	70	24
	Alteration of drainage patterns	70	36
6. Storm water runoff management features	Sedimentation and siltation of watercourses	70	33
	Hydrocarbon Contamination	70	18
	Alteration of drainage patterns	70	33
8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation	Contamination of water resources	75	16
9. Stores, workshops & wash bays	Hydrocarbon Contamination	70	33
	Degradation of soil resources	65	33
	Contamination of water	70	33



	resources		
	Chemical Fires	65	22
10. Ablutions & change house with mobile sewage treatment plant	Contamination of water resources	70	33
11. Fuel operating power generators	Hydrocarbon Contamination	70	33
	Degradation of soil resources	65	33
	Contamination of water resources	70	33
	Chemical Fires	65	24
13. Fuel storage	Emission of noxious fumes	65	33
	Hydrocarbon Contamination	70	33
	Degradation of soil resources	64	22
	Contamination of water resources	70	33
	Chemical Fires	65	24
14. Employment of workers and procurement of construction materials.	Population Influx – Community Conflict	65	32
Operational Phase			
17. Employment of workers	Population Influx – Community Conflict	65	32
18. Topsoil and subsoil stripping & stockpiling for mining operation area	Vegetation and habitat loss	85	55
	Destruction of Wetlands	75	40
	Hydrocarbon Contamination	70	36
	Sedimentation and siltation of watercourses	70	36
	Water level reduction and contamination	65	36



	Destruction of graves	65	36
	Degradation of cultural significance heritage sites	65	33
	Erosion	70	33
	Alteration of drainage patterns	75	48
	Destruction of upstream tributaries and reduction in water in the catchment	65	36
19. Opencast mining excavations	Hydrocarbon Contamination	70	27
	Degradation of soil resources	70	55
	Erosion	70	44
	Vegetation and habitat loss	85	55
	Contamination of water resource	70	33
	Sedimentation and siltation of watercourses	75	48
	Alteration of drainage patterns	80	60
	Destruction of upstream tributaries and reduction in water in the catchment	65	44
	Alteration of the visual environment and topography	85	55
20. Drilling & Blasting	Degradation of soil resources	70	55
	Contamination of water resource	70	33
	Hydrocarbon contamination	70	44
	Damage to surrounding landowner properties	65	36
21. RoM & product stockpiling	Hydrocarbon contamination	65	33
	Dust generation	70	44
	Erosion	70	44



	Contamination of water resource	70	33
	Vegetation and habitat loss	70	55
	Sedimentation and siltation of watercourses	70	33
	Alteration of the visual environment and topography	80	55
22. Residue stockpiles	Dust generation	70	36
	Degradation of soil resources	70	55
	Sedimentation and siltation of watercourses	70	33
	Contamination of water resources	70	33
	Vegetation and habitat loss	70	55
	Alteration of drainage patterns	80	44
	Hazardous Leachate	75	33
23. Screening Operations	Hydrocarbon contamination	65	21
	Dust generation	70	36
	Degradation of soil resources	70	33
	Contamination of water resources	70	33
	Sedimentation and siltation of watercourses	70	33
24. Discard disposal (backfilling of mining area)	Hydrocarbon contamination	70	27
	Dust generation	65	24
	Degradation of soil resources	70	44
	Erosion	70	36
	Contamination of water resource	70	33
	Sedimentation and siltation of	70	33



	watercourses		
25. Waste generation, storage, and disposal	Contamination of water resources	65	27
	Illegal dumping	75	27
	Hazardous Leachate	75	27
27. River crossings	Hydrocarbon contamination	65	27
	Erosion	65	36
	Sedimentation and siltation of watercourses	70	44
	Alteration of drainage patterns	75	33
28. Water supply (potable & process)	Improper water storage management	70	18
	Contamination of water resource	70	14
29. Storage of fuel and lubricants in temporary facilities	Hydrocarbon contamination	70	24
	Chemical fires	80	16
30. Vehicular activity on haul roads; and operation of mining equipment	Hydrocarbon contamination	65	27
	Degradation of soil resources	70	33
	Erosion	65	33
	Sedimentation and siltation of watercourses	70	33
31. Bulk transporting of Ore to market on Public	Dust generation	75	27
	Pressure on public transport infrastructure	65	50
32. Water Management	Erosion	65	36
	Improper water storage management	65	27
	Contamination of water resources	70	33





	Sedimentation and siltation of watercourses	70	33
	Alteration of drainage patterns	75	36
	Water level reduction and contamination	70	27
	Destruction of upstream tributaries and reduction in water in the water catchment	70	27
33. Rehabilitation of mining areas	Erosion	70	36
	Sedimentation and siltation of watercourses	70	36
	Degradation of soil resources	80	24
	Vegetation and habitat loss	80	30
Decommissioning Phase			
35. Demolition / removal of portable and related infrastructure	Erosion	75	24
	General Waste generation & Littering	65	24
37. Rehabilitation of the lay down, stockpile and mining areas	Erosion	65	24
	Sedimentation and siltation of watercourses	75	18
	Influx of alien invasive vegetation	65	18
	Degradation of soil resources	70	18
	Vegetation and habitat loss	85	32
38. Demolition of Sedimentation Ponds	Degradation of soil resources	70	24
	Erosion	65	24
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Hydrocarbon contamination	70	24
	Degradation of soil resources	70	18
	Erosion	65	24



	Contamination of water resources	70	16
	General waste generation & Littering	65	24

It is clear from the assessment listed above that there will be a number of impacts that poses a **high negative significant** impact. However if the mitigation measures proposed in Part B (EMPr) of this report are implemented, monitored and audited throughout the life cycle of the Spitsvale Mine, the impacts can be mitigated to a **medium/low negative significant** impact or avoided all together.

The specialist studies and impact assessment highlighted the following areas of concern that would require attention throughout the life cycle of the proposed Spitsvale Mine:

- Waste classification results, as indicated in **Appendix V**, and required engineering designs associated to the residue stockpile areas;
- Terrestrial ecological status of the areas affected by the proposed mining activities as the Spitsvale Mine is within the Sekhukhune centre of endemism;
- Control and management of alien invasive species;
- Ambient air quality affecting surrounding landowners, communities, the public, and personnel;
- Noise quality affecting surrounding landowners, communities, the public, and personnel;
- Protection of water bodies, i.e. rivers, streams, drainage lines, wetlands, and storm water channels;
- Water quality as per the authorised water use licence;
- Identified heritage sites as listed in **Appendix R**;
- Storm water management and erosion prevention (As per engineering designs attached as **Appendix D**);
- Ensuring proper Waste Management activities throughout each phase of the project;
- Management of hazardous substances and maintenance of mining plant/vehicles/equipment;
- Protection of topsoil and fertile soil throughout the entire life cycle of the Spitsvale Mine; and
- Rehabilitation measures to ensure post-mining land capability;
- Relationships with the I&AP throughout the entire life cycle of the project; and
- The human health of the surrounding communities.

## ii) 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 .Attach as Appendix)*

See **Appendix C.1 & C.2**.



**iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives**

Throughout this report a number of positive and negative implications and risk associated to the proposed Spitsvale Mine (Table 15) have been identified. As discussed in the previous sections there are no Project related alternatives.

*Table 15: Summary of positive and negative implications and risks associated to the Spitsvale Mine*

Positive Implications	Negative Implication and risk
<ul style="list-style-type: none"> <li>• Job creation</li> <li>• Positive contribution to social economic development</li> <li>• Contribute to the national GDP</li> <li>• Open communicate with the I&amp;AP of environmental findings and performance will contribute the learning opportunity of the surrounding communities.</li> </ul> <p>Implementing recommendations made in <b>Appendix Q</b> will result in the following positive implications:</p> <ul style="list-style-type: none"> <li>• Possibly stimulate the increase in household income</li> <li>• Increase the ability to afford healthier food and associated improved nutritional and health status</li> <li>• Raise awareness within the community on all associated human health risks.</li> </ul> <p>Implementing the recommendations made in <b>Appendix L</b> regarding the management of alien invasive species may result in the following positive outcomes:</p> <ul style="list-style-type: none"> <li>• Promote the knowledge and need for the eradication of alien species within the surrounding communities</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of vegetation and habitat</li> <li>• Degradation of soil resources</li> <li>• Degradation of ambient air quality due to dust generation</li> <li>• Noise generation</li> <li>• Hydrocarbon contamination and pollution</li> <li>• Erosion</li> <li>• Contamination of water resources</li> <li>• Sedimentation and siltation of watercourses</li> <li>• Alteration of drainage patterns</li> <li>• Influx of alien invasive vegetation</li> <li>• Alteration of the visual environment and topography</li> <li>• Destruction or degradation of significant heritage sites and graves</li> <li>• Waste generation (hazardous and general waste)</li> <li>• Health and safety of employees</li> <li>• Community conflict caused by population influx</li> </ul>

**I) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr**

*(Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.)*

Part B of this report provides the proposed EMPr. The purpose of the EMPr is to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment will be mitigated, controlled and monitored. It also addresses the environmental impacts during the Construction, Operational, Decommissioning and Post-Closure Phases of the proposed activities.



The main focus of the EMPr is environmental protection throughout the life cycle of the proposed mining project. A number of environmental recommendations are therefore made to achieve environmental protection.

The environmental and social objectives are set to allow the mining of the chromitite and all associated mineral resources in an environmental and socially responsible fashion while ensuring that sustainable closure can be achieved. To achieve closure the correct decisions need to be taken during the planning phase.

The following Environmental Objectives and goals formed the baseline for the development of the EMPr in Part B of this report:

- Protect the biophysical environment from any impacts that cannot be mitigated and that will negatively impact on biodiversity on a regional scale;
- Preserve the water resources in line with the objectives of the integrated catchment management and thereby ensure that the limited available resources are utilised to the maximum benefit of the country and its inhabitants;
- Ensure that activities are carried out so as to aid rehabilitation;
- Ensure a safe and healthy environment for people to live in as is stipulated in the constitution; and
- Ensuring compliance to legislation, regulations, and national standards throughout the life cycle of the project.

The following socio-economic objectives should be attained during the entire life cycle of the proposed activities:

- Adhere to an open and transparent communication procedure with stakeholders at all times.
- Ensure that accurate and regular information is communicated to I&APs in a manner which is understandable and accessible.
- Mitigate negative impacts.
- Enhance Project benefits and minimise negative impacts through intensive consultation with stakeholders.
- Assemble adequate, accurate, appropriate, and relevant socio-economic information relating to the context of the operation.
- Ensure that recruitment strategies for the mine, prioritise the sourcing of local labour, and share in gender equality.
- Ensure an atmosphere of equality and non-discrimination among the workforce.
- Contribute to the development of functional literacy and numeracy among employees.
- Empower the workforce to develop skills that will equip them to obtain employment in other sectors of the economy.
- Contribute to the development of a self-reliant (not dependent on the mine) community surrounding the area of operation.
- Ensure that decommissioning and retrenchments take place in a legally compliant and humane manner.



The overall rehabilitation objectives for this project are as follows:

- Maintain and minimise impacts to the ecosystem within the project area.
- Re-establishment of the pre-development land capability to allow for a desirable post mining land use.
- Prevent excessive losses of soil resources, including soil seed banks, by adequately managing stormwater and accelerated erosion.
- Prevent soil, surface water and groundwater contamination.
- Comply with the relevant local and national regulatory requirements.
- Maintain and monitor the rehabilitated areas until they have reached a stable state in which a gradual natural succession to an optimal natural species composition can progress.

The closure objectives which will drive the closure criteria, **Appendix U**, and which have been developed to support the closure vision are:

- Adhere to all statutory and other legal requirements.
- To develop landforms supporting stable and functioning ecosystems, are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks.
- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders.
- Physically and chemically stabilise remaining structures to minimise residual risks.
- Promote bio-diversity and biological sustainability to the maximum extent practicable.
- Utilize closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.
- To achieve agreed quality targets set by the Catchment Management Authority (CMA) and the Department of Water and Sanitation (DWS) as far as practical relative to impacts and reasonability to achieve.

#### **m) Final proposed alternatives**

*(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)*

As discussed in the previous sections no alternatives were considered regarding the properties proposed for the activities.

The site layout (**Appendix C.1**) indicates existing infrastructure resulting from the prospecting phase of the Spitsvale Mine that will be utilised as part of the proposed mining activities. The location of additional required infrastructure within



the authorised properties in terms of the prospecting right must be carefully considered with regards to sensitive environmental and social receptors (**Appendix H.1**).

#### n) Aspects for inclusion as conditions of Authorisation

*(Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation)*

The conditions for authorisation are recommended to include the following:

- All comments and concerns raised by the registered I&AP be considered and incorporated into the final EMPr;
- The Spitsvale Mine Rehabilitation, Closure and Liability plan attached as **Appendix U** should be considered as the **first draft** and a living document. A number of assumptions, gaps and uncertainties were identified during the preparation of this report. It is recommended that it be reviewed. As highlighted in **Part A section q)ii)(2)**, on granting of the authorisation for the proposed mining activities to proceed a final Annual Rehabilitation plan and a Risk Assessment plan as specified by GNR 1147 must be submitted to the competent authority for approval;
- If any changes to the site layout plan should occur, this plan must be submitted to the DMR for review. In addition to the changes of the site layout, should additional listed activities (in terms of section 24 of NEMA) be triggered, the process as described in Chapter 5 of GNR 982 must be implemented;
- Conditions stipulated in the final EMPr and closure plan must be adhered to;
- Conditions stipulated in all other permits or authorisations must be implemented; and
- All recommendations made in the EIR and specialist studies must be implemented and considered in the finalisation of the site layout plan and operational design of the proposed mining development.

#### o) Description of any assumptions, uncertainties, and gaps in knowledge

*(Which relate to the assessment and mitigation measures proposed)*

All conclusions, findings, and recommendation were made on the assumption that information provided by the applicant to the appointed EAP and specialists were accurate.

With reference to the development of the Spitsvale Mine Rehabilitation, closure and liability plan (**Appendix U**) the following assumptions, uncertainties, and gaps were highlighted:

- The areas and components included in the current assessment were supplied to EMA by the applicant and the EIA specialist reports at the time of this report.
- In the absence of exact measurements of infrastructure and proposed mining activity footprints, these were determined roughly from Google-Earth imagery.
- For future annual reviews, all infrastructure and mining footprint drawings will be updated to reflect the current on-site situation, as well as reference all infrastructure and photograph where deemed necessary by the reviewers to be able to provide more detailed reference maps and compilations of a bill of quantities.



- It is assumed that upon a premature closure of the mine, the same liability will arise as at Life of Mine Closure, but at that stage total area affected and hence cost may be reduced.
- Life of Mine Closure operations also include the necessary monitoring and mitigation of possible residual and/or latent impacts post mining closure operations.
- The Rehabilitation and Closure Plan is considered a 'living document' that will be reviewed and updated annually to ensure that all new insights and developments are adequately covered.
- Closure commences once the final stages of ore extractions commence.
- The applicant will ensure final revegetation will take place on all exposed disturbed areas.
- Security will be required during the closure period to limit access of unauthorized people. Once the closure activities are complete and the operation enters the care, maintenance and monitoring period, security will be withdrawn from the site.
- Water management will be required to limit sediment load releases until such time as the vegetation is established and limits erosion potential on the disturbed rehabilitated areas.
- Water management infrastructure will be retained until such time as contact water can be released to the environment to prevent soil erosion.
- Prior to closure the leachate and runoff from the surface of the rehabilitated areas will be monitored to determine if the quality will meet the WUL requirements for discharge or requires management on site.
- The sediments in the various rehabilitated areas are not likely to be classified as hazardous.
- Salvageable equipment will be removed and transported offsite prior to the commencement of demolition.
- The water and power reticulation and associated infrastructure will be retained until such time as water and power are no longer needed on site.
- At closure all temporary portable ablution facilities and a conservancy tank will be removed on completion of the construction phase. All waste generated during the construction phase will be stored at existing storage facilities and disposed of appropriately, as per the mine's current waste management procedures.
- BCR Minerals (Pty) Ltd assume that the effluent released from the ablution facilities during the operational period will not have a significant impact on the soils and groundwater. Therefore no remedial measures for soil and groundwater contamination are considered in this plan. It is important that the validity of these assumptions is revisited with each revision of the closure plan to ensure that the final decommissioning and closure plan is based on a sound baseline description.

It has also been pointed out in previous section that the EIR and EMPr be reviewed to include the findings and recommendations stipulated in the closure plan. The revised report has been subjected to the stipulated 30 days PPP as required in the 2014 EIA regulations. The comments or concerns received after the 30 days PPP period has been considered in the final EIR and EMPr.



**p) Reasoned opinion as to whether the proposed activity should or should not be authorised**

**i) Reasons why activity should be authorised or not**

Environmental Management Assistance (Pty) Ltd as the appointed independent EAP and the associated Specialist recommends that on the conditions that all the requirements, conditions, and measures listed in this document and associated appendices be adhered to, that there is no reason why this activity should not be authorised.

Authorisation must be subjected to the completion of all requirements stipulated by GN R. 982 and GN R. 1142.

**ii) Conditions that must be included in the authorisation**

A number of conditions have been highlighted in previous sections of this report.

To summarise, the following conditions must be subjected to authorising the proposed mining development:

- All comments and concerns raised by the registered I&AP be considered and incorporated into the final EIR and EMPr where applicable & practicable;
- The Spitsvale Mine Rehabilitation, Closure and Liability plan attached as **Appendix U** must be considered as the **first draft** and a living document. A number of assumptions, gaps and uncertainties were identified during the preparation of this report. It is recommended that it be reviewed. As highlighted in **Part A section q)ii)(2)**, on granting of the authorisation for the proposed mining activities to proceed a final Annual Rehabilitation plan and a Risk Assessment plan as specified by GNR 1147 must be submitted to the competent authority for approval;
- If any changes to the site layout plan should occur, this plan must be submitted to the DMR for review. In addition to the changes of the site layout, should additional listed activities (in terms of section 24 of NEMA) be triggered, the process as described in Chapter 5 of GNR 982 must be implemented;
- The residue stockpiles must comply with the recommended engineering designs as per GN.R. 636;
- Conditions stipulated in the final EMPr and closure plan be adhered with;
- Conditions stipulated in all other permits or authorisations must be implemented; and
- All recommendations made in the EIR and specialist studies be implemented and considered in the finalisation of the site layout plan and operational design of the proposed mining development.

**(1) Specific conditions to be included into the compilation and approval of EMPr**

All requirements stipulated by the final EIR, as well as the developed Spitsvale Mine Rehabilitation Closure and Liability plan and comments received by the I&AP be incorporated into the final EMPr.





## (2) Rehabilitation requirements

The Spitsvale Mine Rehabilitation Closure and Liability plan has been developed according to GNR 1147 published under the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

The purpose of these regulations is to regulate the determination and making of financial provision as contemplated in NEMA for the cost associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting and mining operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future.

This regulation requires the following documents:

- Annual rehabilitation, as reflected in an annual rehabilitation plan;
- Final rehabilitation, decommissioning and closure of the prospecting or mining operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and
- Remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

The required documents listed above has been combined and incorporated into the first **draft** Spitsvale Mine Rehabilitation closure and Liability plan attached as **Appendix U**.

### **Annual rehabilitation**

GNR 1147 stipulates the requirements of the annual rehabilitation plan. The annual rehabilitation plan will be relevant for a period of 1 year, after which the plan will be updated by BCR Minerals (Pty) Ltd to reflect progress relating to rehabilitation and remediation activities in the preceding 12 months and to establish a plan, schedule and budget for the forth coming 12 months. The purpose of this document is to explain the following:

- Definition of concurrent rehabilitation and remediation activities for the forthcoming 12 months;
- how these relate to the operations' closure vision, as detailed in the final rehabilitation, decommissioning, and mine closure plan;
- indicate what closure objectives and criteria are being achieved through the implement the plan; and
- Must be measurable and auditable.

As explained in **Appendix U**, a detailed annual rehabilitation plan for mining related activities cannot be devised at this stage of the process. However, general expectations on annual rehabilitation have been defined in the **draft** report and will be required to be reviewed and updated on an annual basis. Therefore, as soon as the proposed mining activity has been granted and authorised, the final annual rehabilitation plan will have to be developed in detail.

### **Final rehabilitation, decommissioning and closure plan**



GNR 1147 lists a number of requirements for the final rehabilitation, decommissioning and closure plan. This plan must include or describe the following:

- Must be measurable and auditable;
- Must take into consideration the proposed post-mining end use of the affected area;
- Must contain information that is necessary for the definition of the closure vision, objectives, design, and relinquishment criteria;
- Indicate what infrastructure and activities will ultimately be decommissioned, closed, removed and remediated;
- The risk drivers determining actions, indicating how the closure actions will be implemented to achieve closure relinquishment criteria; and
- Indicate monitoring, auditing and reporting requirements.

The Spitsvale Mine Rehabilitation closure and Liability plan (**Appendix U**) addresses the requirements stipulated above. However it is recommended that this report be reviewed and a final plan be submitted.

### ***Risk assessment Report***

The environmental risk assessment report must contain information that is necessary to determine the potential financial liability associated with the management of latent environmental liabilities post closure, keeping in mind the proposed post-mining end use, once the initial relinquishment criteria have been achieved.

Although the potential impacts associated with the proposed mining activities have been identified throughout the EIA process, the identification of latent risks, without the initiation of full mining activity and monitoring of the implement the relevant mitigation strategies, remains hypothetical at this stage and thus is not possible to assess.

In an effort to prevent any possible latent impacts/risks from the proposed mining activities during operation and post closure, the following knowledge gaps have been identified in **Appendix U** to be addressed annually during operation and/or upon closure where applicable:

- Slope water management.
- Stability and seepage analyses.
- Closure material characterisation.
- Vegetation trials on blended growth media.
- Closure water balance.



After initiation of full mining activities, on an annual basis, the anticipated impacts identified by the various specialists and their mitigation recommendations in the EIR and EMPr is recommended to be reviewed and form part of the Risk Assessment report to:

- Determine any impacts that have not been accounted for that need to be either mitigated or managed. This may also include a socio-economic analysis, if deemed necessary, and possible related post-closure liabilities that may arise from the mining activities or abandonment thereof.
- Determine the possible extent of residual and/or latent impacts that may arise and that will have to be managed.
- Monitor and verify the effectiveness of the annual rehabilitation and final closure plan to address especially the following:
  - Sources and degree of accelerated erosion due to anthropogenic influence
  - Effectiveness of storm water control
  - Sources of pollution
  - Extent and possible sources of alien invasive infestation
  - Effectiveness of re-vegetation methods implemented
  - Effectiveness of mitigation measures prescribed in the Environmental Management Programmes

**q) Period for which the Environmental Authorisation is required**

The expected life of mine has been determined to be 30 years. However, should the proposed mine development exceed this period, it is recommended that the environmental authorisation be revised.



#### r) Undertaking

*(Confirm 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 Basic assessment report and the Environmental Management Programme report.)*

See Part B of this report and **Appendix W**.

#### s) Financial Provision

*(State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.)*

As part of the Spitsvale Mine Rehabilitation closure and Liability plan (attached as **Appendix U**), the financial provision for the mining operations were determined based on information currently available.

An assessment was conducted of all the infrastructure and activities taking place on site that fall within the properties associated to the mining right application. The infrastructure was classified in accordance with the tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. A separate calculation was done to include the costs associated with Phase 1 (including laydown area 1, Klarinet Koppie opencast pit and the associated ROM stockpiles). A supplementary calculation was done to incorporate Phase 2 & 3 and a second laydown area. These extensions are planned as part of the next phases of the project and will only commence once phase 1 mining operations have ceased.

The premature quantum was calculated using the demolition and rehabilitation rates and has been calculated as **R 6 140 648.41 (including P&G, contingency and excluding VAT)** for the physical and biophysical components associated with the current activities and infrastructure on the site. This related to Open pit 1, Laydown area 1, Ore stockpile area, ROM stockpile area and roads.

It is evident that the biophysical component of rehabilitation makes for 100% of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of the biophysical component. The physical rehabilitation (demolition and removal of structures) amounts to 0% of the liability cost. For the reason that all infrastructure will either be removed off site by the mining contractor or be taken over by the community. Therefore, the biophysical component contributes solely to the calculated closure costs for premature closure. A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

The community have expressed an interest in some of the physical infrastructure, such as some of the laydown area buildings, the access and haul roads as well as the ROM stockpile's footprints for future use.

A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the



waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

The quantum calculated for all activities and infrastructure associated with the entire Spitsvale Mine (including mining of phase 2 and 3 and the associated infrastructure) was calculated as **R8 699 326.49 (including P&G, contingency and excluding VAT)**. The increase in biophysical costs (between the current and proposed costs) can be attributed to the addition of two opencast pits, with their associated infrastructure, in the future. All physical infrastructure to be constructed in the future will also be either removed upon closure by the mining contractor or given to the community.

The costing sheets have been reviewed externally by a registered financial institution for correctness regarding the calculations. Based on the current information it is estimated that the accuracy level of the phase 1 calculation is 95% and the accuracy level of the calculation of the future mining development is 50%.

The detailed mine closure cost assessment report is attached as an Appendix C to **Appendix U**.

#### **i) Explanation of deriving provisions**

The CES Group was contracted by Shangoni (appointed by the EAP) to acquire rates for demolition and rehabilitation of mining activities. Procurement of budget pricing approached by identifying reputable demolition companies, various sites of varying sizes at various locations and identifying local companies in the study area with ability to work on similar scale project. A bill of quantities (BoQ) was distributed to the various companies.

The prices received from contractors were reviewed by the CES Group, after which average and meridian rates were drawn rates to correctly establish a baseline rate. The following methods to establish the baseline rates were followed:

- Price A - Average if priced – across the board average of rates received per category;
- Price B - Median pricing – “middle” rate of all rates in series per category;
- Price C - Average between Price A & B;
- Price D - Average rate excluding top and bottom rates per category.
- Price D - rate category that was used in the closure cost calculation, unless otherwise indicated in the closure cost spreadsheet “Rate” sheet.

The closure budget consists of the following areas:

- Physical - Demolition of infrastructure where infrastructure does not form part of end land use. Potential to transfer to third party was identified.



- Biophysical - Actions to safeguard (making safe and stable) and re-establish the biophysical to ensure a sustainable landform and mitigate identified risks. This includes levelling of the dumps, seeding of the trees and grass.

The detailed mine closure cost assessment report is attached as an Appendix C to **Appendix U**.

**ii) Confirmation that amount can be provided for from the operating expenditure**

*(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be)*

Once the EA has been received, the applicant will review the annual rehabilitation plan as per GNR 1147, a financial provision as per regulation 7 and 8 must be provided.

**t) Deviations from the approved scoping report and plan of study**

This section will highlight deviation from the approved scoping report and plan of study submitted on the 19 September 2016.

**Listed and specified activities**

During the environmental impact assessment phase following the scoping phase, the applicant appointed a suitably qualified engineer to design the Storm Water Management Plan (SWMP) according to the recommendations made by the Hydrological Assessment (**Appendix G**).

A total of two (2) sedimentation ponds with the following dimensions, were recommended and designed:

Storage Number	Total catchment area (m <sup>2</sup> )	Design Flow (m <sup>3</sup> /s)	Minimum Basin Volume (m <sup>3</sup> )	Recommended Basin Volume (m <sup>3</sup> )	Dimensions of Structure			
					L (m)	We (m)	D (m)	Total Volume (m <sup>3</sup> )
<b>S1</b>	69 832.918	6.7000	1 050	1 400	42	13	2	1 428
<b>S2</b>	50 319.310	4.8000	755	1 100	40	10	2	1 120

The construction of the sedimentation ponds will trigger the following listed activity, and therefore the assessment of potential impacts was assessed as part of this report:

- Category A Listed Activity 1 of GN. R 921: “The storage of general waste in lagoons”

**i) Deviation from the methodology used in determining the significance of potential environmental impacts and risks**



*(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation)*

The methodological approach in determining the significance of the potential environmental impacts and risks are described in section 1) vi). This approach is identical to the approach described in the approved Scoping report submitted on the 19 September 2016.

## ii) Motivation for deviation

As highlighted, the applicant appointed a qualified engineer to develop the SWMP according to the recommendations as highlighted in the Hydrological Assessment (**Appendix G**).

The design parameters recommended by the engineers required that a total of 2 (two) sedimentation ponds be constructed. The construction of the sedimentation ponds triggers Category A Listed Activity 1 of GN.R. 921.

## u) Other information required by the competent Authority

The Environmental Authorisation (**Appendix E**) in terms of terms of the following listed activity has been granted on the 24 October 2016:

Activity 17 of GN.R. 984: *“Any activity which requires a mining right as contemplated in section 22 of the Mineral Resources and Petroleum Development Act (MPRDA), 2002 (Act no. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the MPRDA.”*

Section 3.26 (Annexure 2) of the EA received stated the following:

*“The holder of EA must note in terms of section 20 of the National Environmental Management Waste Act, 2008 (Act. 59 of 2008), no person may commence, undertake or conduct a waste management activity, except in accordance, with the requirements of norms and standards determined in terms of section 19 (3) for that activity or a waste management licence is issued in respect of that activity if licence is required.”*

The Scoping acceptance letter received on 12 December 2016 requested the following additional information:

- Ensure comments received from all relevant stakeholders are submitted to the DMR with the EIR and EMPr. This includes but is not limited to the South African Heritage Resource Authority (SAHRA), Department of Economic Development, Environment and Tourism (LEDET), Department of Agriculture, Forestry and Fisheries (DAFF), and Department of Water and Sanitation (DWS). Proof of correspondence with the various stakeholders must be included in the EIR. Should you be unable to obtain comments, proof of attempts that were made to obtain comments should be submitted.



In addition, the following information was requested:

- ***Details of the future land use for the site and infrastructure after decommissioning in 20-30 years***

This information is provided in **section 1 (b)** and **Appendix O**.

- ***The total footprint of the proposed footprint should be indicated***

See section **3 d) i)** (Listed and specified activities).

- ***Should a Water Use Licence be required, proof of such application needs to be submitted***

Find proof of submission attached as **Appendix X**.

- ***Possible impacts and effects of the development on the ecology with regard to lowland-highland interface in the locality should be indicated***

An in depth terrestrial ecological assessment was conducted. Find **Appendix M** for the detailed report.

- ***Possible impacts and effects of the development on the surrounding industrial area should be indicated***

Table 11 summarises all associated impacts and aspects. See socio-economic impacts identifying possible impacts on the surrounding industrial area.

- ***Information on services required on site, e.g. sewage, refuse removal, water , electricity, etc. , and suppliers (s) agreement/confirmation should be submitted***

Find service agreements as **Appendix Y**.

- ***A construction and operational phase of the EMPr should include impacts mitigation and monitoring measures***

See Part B of this document.

It was also pointed out by the competent authority that a lagoon as one of the activities suspected to be triggered by the proposed activity should be properly assessed and included in the EIR and EMPr.

**i) Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of NEMA**

Section 24 (4)(a) and (b) of NEMA states the following:

*“Procedures for the investigation, assessment and communicate of the potential consequences or impacts of the activities on the environment – (a) must ensure, with respect to every application for an environmental authorisation –*





- (i) Coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state;*
- (ii) that the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project;*
- (iii) that a description of the environment likely to be significantly affected by the proposed activity is contained in such application;*
- (iv) investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and*
- (v) public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and*
- (b) must include, with respect to every application for an environmental authorisation and where applicable –*
  - (i) 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;*
  - (ii) investigation of mitigation measures to keep adverse consequences or impacts to a minimum;*
  - (iii) investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act;*
  - (iv) reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information;*
  - (v) investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implement;*
  - (vi) consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and*
  - (vii) provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question.”*

Section 24 (3)(a) and (7) of NEMA states the following:



*“24 (3) The Minister, or an MEC with the concurrence of the Minister, may compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority.”*

*“24 (7) Compliance with the procedures laid down by the Minister or an MEC in terms of subsection (4) does not absolve a person from complying with any other statutory requirement to obtain authorization from any organ of state charged by law with authorising, permitting or otherwise allowing the implementation of the activity in question.”*

The purpose of Part A and Part B of this report fulfils the requirements stipulated in section 24 of NEMA. This report resulted with the outcomes of the detailed impact assessment carried out and provides recommendations from a broad spectrum of expertise.

### **(1) Impact on the socio-economic conditions of any affected persons**

*(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein)*

The Spitsvale social and labour plan (**Appendix F**) and the Human health impact assessment (**Appendix Q**) addresses the associated impacts on the socio-economic conditions.

Section **1)(a)XI** of this report summarises the findings of the Human Health Impact assessment.

### **(2) Impact on any national estate referred to in section (3)2 of the National Heritage Resource act**

*(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein)*

A detailed Heritage Impact Assessment is attached as **Appendix O** Section **1)(a)XII** summarises the findings and recommendations made by the specialist investigation.

### **v) Other matters required in terms of sections 24(4)(a) and (b) of the Act**

*(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4).*

As discussed in previous sections in this report, no alternatives were considered. The proposed Spitsvale Mine is located within the BCR Minerals (Pty) Ltd prospecting and bulk sampling right area (LP30/5/1/1/2/10624PR (Kennedy's Vale) and LP30/5/1/1/2/10603PR (Spitskop)) and the surrounding area is currently used for mining related activities. The Mining Right area can only be located within the Prospecting Right area.



## **PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

The purpose of this section is to provide a baseline Environmental Management Programme (EMPr) to essentially form part of the Spitsvale Mine Environmental Management System (EMS). The information provided in this section describes guidelines, operating procedures and rehabilitation/pollution control requirements. The EMPr is a legally binding document that the holder of the Environmental Authorisation and/or Waste Management License is responsible for implementing.

The recommendations and procedures stipulated in the EMPr are based on the findings discussed in Part A of this report. It is therefore essential that this portion be carefully studied, understood, implemented and adhered to at all times.

Part B of this report should be considered as a "living" document, to be reviewed and amended as deemed necessary.

The reasons for review and/or amendments may be the following:

- Failure to identify certain risk or impacts during the initial EIA process; and
- The inability of the EMPr to sufficiently provide for the avoidance, management, and mitigation of environmental impacts associated with the undertaking of authorised activities.

In the event that additional activities, not specified in the EIR and EMPr, are to take place, the impacts associated to those activities must be assessed according to the requirements stipulated by GN R. 982. Therefore this EMPr is only applicable to the listed activities stipulated in **Part A section d)i)** and/or those authorised in terms of the Environmental Authorisation.

### **1) Draft environmental management programme.**

Part B of this report is considered to be the first draft of the EMPr and is subject to the approval of the Department of Minerals and Resources (DMR). Once approved the EMPr must be finalised as a legally binding document that is to be read together with the Environmental Authorisation.

#### **a) Details of the EAP**

*(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required)*

As stipulated in Part A section 1 (a).

#### **b) 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 (1)(h) herein as required)*

As stipulated in Part A, section (1) (h).



### c) 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)*

Find **Appendix C.1**.

### d) Description of Impact management objectives including management statements

Throughout Part A and Part B of this report, a number of possible environmental and social impacts/risks have been identified. The sections to follow will provide the management approach related to each potential impact/risk by defining management and outcome based objectives.

#### i) Determination of closure objectives

(Ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

In compliance to GN R. 1147 of 20 November 2015, a number of closure objectives have been determined. The closure objectives, identified in the Spitsval Mine Rehabilitation, Closure and Liability plan (**Appendix U**), which will drive the closure criteria and which have been developed to support the closure vision are:

- Adhere to all statutory and other legal requirements.
- To develop landforms supporting stable and functioning ecosystems that are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks.
- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders.
- Physically and chemically stabilise remaining structures to minimise residual risks.
- Promote bio-diversity and biological sustainability to the maximum extent practicable.
- Utilize closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.
- To achieve agreed quality targets set by the Catchment Management Authority (CMA) and the Department of Water and Sanitation (DWS) as far as practical relative to impacts and reasonability to achieve.

The objectives and targets set out in Part B (EMPr) of this report will aid in reaching the objectives stipulated in the Spitsvale Mine Rehabilitation, Closure and Liability Plan.



**ii) 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**

This section describes the approach taken by the EAP in preparation of Part B of this report.

***Environmental Management Approach***

Globally, there are a number of tools or guideline documents available to assist or describe environmental management. The purpose of an EMPr (Part B of this report) is to describe the process for managing the identified potential environmental impacts or risks described in Part A of this report (EIR) throughout the entire life cycle (from design, to implement, operation, and decommissioning) of the proposed Spitsvale Mine. The IEM (Integrated Environmental Management) tool used for managing the identified environmental impacts by the EAP in this document is the Environmental Management System (EMS). This approach will assist the Spitsvale Mine to achieve continual improvement in environmental performance.

The EMPr in essence will be adopting the approach of the internationally recognised ISO 14001 Environmental Management System (EMS) standard that is essentially based on the Deming Cycle rationale which is a simplified continuous improvement model consisting of four main iterative steps.

These steps are described as follows:

- Plan – Establish objectives and processes necessary to deliver results in accordance with the developed organisational environmental policy.
- Do – Implement the process.
- Check – Monitor and measure processes against environmental policy, objectives, legal and other requirements and report the results.
- Act – Take action to continually improve environmental performance.

Continual improvement is achieved by periodically monitoring and reviewing the EMPr and implementing corrective actions when required. Therefore this document should be considered as a living document which must be continuously updated and possibly improved.

This approach taken in the development of the EMPr (Part B of this report) is in line with the requirements stipulated in GN R. 982 (2014 EIA regulations).

***Legislative compliance***

Throughout the development of management measures all legislative and other requirements associated to the proposed Spitsvale Mine activities were considered and highlighted.



### **Specialist recommendations**

A number of specialist investigations formed part of the EIA process and resulted in a number of findings and recommendations (Part A section 1j) summarises the findings). These reports provided specific mitigation and management measures as a recommendation. These findings have been considered throughout the development of the EMPr.

#### **iii) Potential risk of Acid Mine Drainage**

(Indicate whether or not the mining can result in acid mine drainage)

The potential risk for acid mine drainage was not determined as the proposed Chrome related mining activities are not expected to be afflicted by acid-producing wastes.

The Waste Classification (**Appendix V**) supports the above statement. In addition to determining the LC (Leachable Concentrate) and TC (Total Concentrate) of the overburden (WRD), an assessment was conducted to determine the Acid Base Accounting (ABA). Table 17 summarises the results.

The following observations are made from the ABA results:

- The total % Sulphur (determined in a LECO furnace) was used to determine the Acid Potential (AP) of the rock. This is an overestimation as it assumes that all the sulphur in the tailings will be acid-producing.
- No sulphides were detected in any of the samples and therefore the acid potential calculated is low to zero. Generally, sulphide minerals are rarely present in the Bushveld Complex rocks.
- The neutralisation potential of the waste rock is very high (26.4 – 32.5 kg/t CaCO<sub>3</sub>) which indicates that the rock has high potential to neutralise acid.
- The NPR (Neutralising Potential Ratio) indicates the potential for the rock to generate acid drainage, whereas the %Sulphur indicates whether this drainage will be over the long term. From the results it is evident that no net acidification is predicted for the material due to the absence of sulphide minerals and the high neutralising potential of the rocks.
- The waste rock classifies as having no potential to generate acid-mine drainage with potentially no/low salt load that will emanate from the residue material.



Table 16: Acid base accounting results

Acid – Base Accounting Modified Sobek (EPA-600)	Sample Identification	
	WRD1	WRD2
Sample Number	470275	470276
Paste pH	9.20	7.14
Total Sulphur (%) (LECO)	<0.03	<0.03
Acid Potential (AP) (kg/t)	0.09	0.09
Neutralization Potential (NP)	32.5	26.5
Nett Neutralization Potential (NNP)	32.4	26.4
Neutralising Potential Ratio (NPR) (NP : AP)	346.8	282.1
Rock Type	IV	IV
Comments	No acid generation potential	

**iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.**

Based on the result described above, no further steps were taken to investigate, assess, and evaluate the impact of acid mine drainage, as this potential risk is not foreseen as part of Chrome related mining activities.

**v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.**

Not a potential risk.

**vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.**

Not a potential risk.

**vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.**

The permitted volume and rate of water use required for the mining, trenching or bulk sampling operations will be confirmed in the Water Use Licence. However an annual volume of 2.28 mega litre has been estimated at the time of this report.

The main uses for the abstracted water, at the time of this study, will be as follows:

- Dust suppression on the access roads, stockpile areas, and pit areas; and



- Domestic purposes such as the ablution facilities.

**viii) Has a water use licence been applied for?**

An integrated application approach has been taken by BCR Minerals (Pty) Ltd. Therefore an application for a water use licence will be submitted to the Department of Water Affairs and sanitation.

The following water uses are included in the submitted application:

- Section 21 (a) - taking water from a water resource (water will be sourced via a borehole);
- Section 21 (c) - Impeding or diverting the flow of water in a watercourse
- Section 21 (g) - disposing of waste in a manner which may detrimentally impact on a water resource
- Section 21 (j) - altering the bed, banks, course or characteristics of a watercourse
- Section 21 (i) - removing, discharging, or disposing of water found underground if it is necessary for efficient continuation of an activity or for the safety of people

As part of the application for a water use licence an Integrated Waste Water Management Plan (IWWMP) will be developed and must form part of the final construction and operational EMP for implementation.





**ix) Impacts to be mitigated in their respective phases**

(Measures to rehabilitate the environment affected by the undertaking of any listed activity)

In Part A of this report a number of potential environmental and social risks and or impacts was assessed. Table 18 identifies and describes the measures to be taken to ensure a sustainable outcome.

Table 18: Recommended measures to control, avoid, mitigate, and remediate potential environmental and social risks identified in Part A of this report

ACTIVITIES <i>(as listed in 2.11.1)</i>	POTENTIAL IMPACT <i>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</i>	PHASE <i>of operation in which activity will take place. State; Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.</i>	SIZE AND SCALE of disturbance <i>(volumes, tonnages and hectares or m<sup>2</sup>)</i>	MITIGATION MEASURES <i>(describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)</i>	COMPLIANCE WITH STANDARDS <i>(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</i>	TIME PERIOD FOR IMPLEMENTATION <i>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either: Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</i>
<b>Construction Phase</b>						
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p>	<p>Dust generation</p>	<p>Construction &amp; Operational</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a dust fallout monitoring plan.</p> <p>(2) Frequent Inspections of areas prone to dust generation.</p> <p>(3) Report and record incidents related to air quality.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p>	<p>(1) Develop and implement a Dust management plan as part of an Air quality management plan to including the monitoring and prevention programme.</p> <p>(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014.</p> <p>(3) Ensure activities remain under the thresholds</p>	<p>Entire Life cycle of project</p>



<p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p>			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Construction activities to take place under the supervision of an environmental representative</p> <p>(2) Set the on-site speed limit to 40km/h for gravel roads and 50km/h for tar roads.</p> <p>(3) Develop and implement a dust suppression schedule.</p> <p>(4) Biodegradable and environmentally friendly flocculent (approved by the environmental control officer/environmental officer/ SHEQ officer) may be used as dust suppressant.</p> <p>(5) Adequately wet stockpile areas in anticipation of dry and/or windy conditions.</p> <p>(6) Cover loads with tarpaulin when transporting ROM, product, or any material in order to prevent dust generation.</p> <p>(7) Disturbed areas no longer used for mining related activities shall be re-vegetated immediately.</p> <p>(8) Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(2) Ensure compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).</p> <p>(3) Ensure compliance with the National Dust Control regulations (GNR 897 of November 2013).</p> <p>(4) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies requirements regarding the control of emissions from diesel vehicles used on public roads. These requirements must form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Develop a detailed air quality management plan (focusing on sources of dust located in close proximity to the residential receptors within the project boundary) ensuring adherence to thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR) (<b>Appendix J</b>) prior to the commencement of operations.</p> <p>(2) Implement recommended dust control methods as stipulated in Table 6-1 of the BAQIAR (<b>Appendix J</b>).</p>	<p>stipulated in GNR 893 (in terms of section 21 of NEMAQA.</p> <p>(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).</p> <p>(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)</p>	
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			<p>(3) Dust generated from material handling operations and mining operations must be significantly reduced by wet suppression with the use of water sprays.</p> <p>(4) The combined use of water sprays with chemical surfactants provide more extensive wetting making it a more affective technique than water suppression alone.</p> <p>(5) The loading, transfer, and discharge of materials should take place with a minimum height of fall and be shielded against the wind.</p> <p>(6) Controls to reduce emissions from unpaved roads must include vehicle restrictions which limit the speed, weight and number of vehicles on the road, surface improvements (paving or adding gravel to the road), and surface treatments (wet suppression or surface treatments).</p> <p>(7) All positive and negative effects of the different methods of dust suppression must be considered and the best feasible and successful option must be implemented.</p> <p>(8) Wind erosion from stockpiles and open areas must be minimised through the use of water sprays, wind breaks, vegetation and enclosures.</p> <p>(9) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road per given time</p> <p>(10) Hauling activities must be strictly restricted to designated hauling routes.</p> <p>(11) Regular maintenance of the vehicles/trucks (engines) must be undertaken to ensure optimal efficiency of the engine.</p> <p>(12) Regular maintenance of hauling routes and surface improvements (where necessary) must be undertaken.</p> <p>(13) Regular sweeping and cleaning of tarred/paved road surfaces to prevent the accumulation of dust</p> <p>(14) Immediate clean-up of any spillage of material on the hauling routes.</p> <p>(15) Regular inspections must be carried out on the vehicles/trucks (engines, tyres, etc.) and the route to ensure both are in good quality.</p> <p>(16) All material transported must not be left exposed during transportation.</p> <p>(17) Engines of the trucks must not be left running whilst not in use.</p> <p>(18) Clean fuels and fuel efficient vehicles/trucks/mobile equipment must be considered for use.</p> <p>(19) Designated areas for the storage of overburden must be considered and incorporated into the design.</p> <p>(20) Monthly dust fallout monitoring as per the National Dust Control Regulations (2013) and reporting.</p>		
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				<p>(21) Monthly PM10 and PM2.5 ambient monitoring and reporting. This is also recommended to obtain baseline concentrations.</p> <p>(22) All main hauling roads must be treated for dust suppression to maintain at least 65% emission reduction efficiency.</p>		
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>3. Weigh bridge</p> <p>6. Storm water runoff management features</p> <p>9. Stores, workshops &amp; wash bays</p> <p>11. Fuel operating power generators</p> <p>13. Fuel storage</p> <p>15. Transport of construction material, mobile plant and equipment to the site</p> <p>16. Use of existing drilled / new boreholes</p>	<p><b>Hydrocarbon Contamination</b></p>	<p>Construction &amp; Operational</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Hazardous substances management plan addressing handling, storage, and transport of hazardous substances.</p> <p>(2) Develop and implement an emergency response procedure addressing the procedure in case of a chemical spill. This procedure must ensure the fastest possible reaction to spills or accidents as well as addressing remediation procedures.</p> <p>(3) Develop and implement of an incident reporting procedure.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Fuel to be stored in above ground storage tanks or sealed containers.</p> <p>(2) Hazardous substances to be stored within a bund area with a sump drainage.</p> <p>(3) Bunded areas to be designed to contain at least 110% of the storing capacity.</p> <p>(4) All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed environmental representative or the Department within 24 hours.</p> <p>(5) Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used.</p> <p>(6) On site spill kits or absorbent materials must be readily available. These kits must include materials to absorb, breakdown, and where possible encapsulate minor material spillages.</p> <p>(7) Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop areas. Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of any hydrocarbons.</p> <p>(8) All vehicles, plant, and equipment must be inspected on a daily basis. Records to be made available for these inspections.</p>	<p>(1) Develop a water management plan addressing monitoring and management requirements.</p> <p>(2) Develop a storm water management plan addressing the separation of "dirty" and clean "areas"</p> <p>(3) Develop an emergency response plan with specific reference to spill prevention and remediation.</p> <p>(4) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p> <p>(5) Develop and implement a Hazardous substances management plan.</p>	<p>Entire Life cycle of project</p>



			<p>(9) Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment (where possible leaks may occur) when not in use.</p> <p>(10) All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil leakages.</p> <p>(11) Leaking equipment shall be removed and repaired immediately from site to facility designated for repairs.</p> <p>(12) Oil separators feeding into the sedimentation ponds must be maintained at all times. Frequent inspections and cleaning of sludge to take place.</p> <p>(13) Sludge from oil separators to be disposed of by an authorised service provider. Records to be kept of such disposal.</p> <p>(14) The quality of the water from the sedimentation ponds to be tested before re-use as dust suppressant. The water quality to be in compliance with requirements stipulated by the WUL (Water Use Licence).</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 30 of the National Environmental Management Act (NEMA), Act 107 of 1998 describes measures to be taken to control emergency incidents. These requirements must be included in the development of the Emergency Response procedure.</p> <p>(2) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of incidents involving Hazardous substances. These requirements must also be included in the Emergency response procedure.</p> <p>(3) GN R. 1237 published under the Mine Health and Safety Act of 1996 describes the requirements for the storage of hazardous substances. These requirements must be incorporated into the Hazardous substances management plan.</p> <p>(4) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition of Hazardous chemicals. These requirements must be considered as part of the mine acquisition process.</p> <p>(5) Regulation 277, 273, and 279 of GN R. 225 of the National Road traffic Act of 1996 describes the requirements of transporting hazardous waste. These requirements must be incorporated in both the Hazardous substances management plan and the Waste Management plan.</p> <p>(6) Regulation 277 and 273 of GN R. 225 of the National Road traffic Act of 1996 describes the Loading and offloading of dangerous goods. These requirements must be addressed in the Hazardous</p>		
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			<p>substances management plan.</p> <p>(7) All requirements described in the Hazardous substance Act of 1973 must be included in the Hazardous substances management plan.</p> <p>(8) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the National Environmental Management Act.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) - may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>.);Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p>		
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p><b>Degradation of soil resources</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a soil conservation and stockpile management plan.</p> <p>(2) Frequent Inspections of areas prone to degradation.</p>	<p>(1) Develop a soil conservation management plan.</p> <p>(2) Develop a storm water management plan.</p> <p>(3) Develop and implement a</p>	<p>Entire Life cycle of project</p>



<p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>9. Stores, workshops &amp; wash bays</p> <p>10. Ablutions &amp; change house with sewage treatment plant</p> <p>11. Fuel operating power generators</p> <p>13. Fuel storage</p>			<p>(3) Report and record incidents related to degradation of soil resources.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop of Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area.</p> <p>(2) Do not mix sub-soil with topsoil and fertile soils.</p> <p>(3) Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material).</p> <p>(4) Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the stockpiles with indigenous, non-invasive vegetation.</p> <p>(5) Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood lines.</p> <p>(6) Implement storm water control measures on topsoil and fertile soil stockpiles.</p> <p>(7) Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from erosion.</p> <p>(8) Rehabilitation of areas after the completion of works to take place as soon as possible.</p> <p>(9) Avoid over exposing un-vegetated areas as far as possible.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.</p> <p>(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. These requirements must form part of the Soil Conservation and Stockpile management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Strip all usable soil, irrespective of soil depth.</p> <p>(2) Implement live placement of soil where possible, improve organic status of soils, maintain fertility levels and curb topsoil loss.</p>	<p>vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p>	
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			<p>(3) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion.</p> <p>(4) Loss of agricultural land due to establishment of infrastructure is a long term loss and no mitigation measures exist. Mitigation is restricted to limitation of extent of impact to the immediate area of impact and minimisation of off-site impacts.</p> <p>(5) Loss of agricultural land due to opencast mining is a temporary loss which must be mitigated by appropriate backfilling and re-placement of stockpiled topsoil. If done correctly, most of the original agricultural potential will be restored.</p> <p>(6) An Environmental Coordinator must manage environmental impacts in coordination with construction and operation schedule.</p> <p>(7) In the event that contractors are to be appointed these contractors to sign and undertake environmental compliance.</p> <p>(8) Keep disturbed areas and stockpiles to minimum to prevent soil loss.</p> <p>(9) Identify suitable areas to stockpile stripped soil.</p> <p>(10) Prevent surface runoff and seepage on site from contaminating stockpiled soils and stripped areas.</p> <p>(11) Minimise soil erosion through wind and water</p> <p>(12) Remediate and rehabilitate disturbed areas in accordance with development plan</p>		
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>6. Storm water runoff management features</p> <p>15. Transport of</p>	Erosion	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a storm water management plan.</p> <p>(2) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(3) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(4) Monthly monitoring of water quality (as per recommendation of specialist study).</p> <p>(5) Report and record incidents related to erosion.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop a soil conservation management plan.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>	Entire Life cycle of project





<p><b>construction material, mobile plant and equipment to the site</b></p>			<p>(1) Soil conservation measures to be implemented on stockpiles to prevent erosion. This could include the use of erosion control fabric or non-invasive grass seeding.</p> <p>(2) All areas susceptible to erosion must be identified and protection measures be implemented.</p> <p>(3) Retain natural trees, shrubbery and grass species where possible.</p> <p>(4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to be implemented, specifically when excavations or disturbances takes place within river banks, or the river bed.</p> <p>(5) Formation of erosion channels ("dongas") to be prevented by applying soil erosion control and bank stabilisation procedures as specified by a qualified environmental specialist.</p> <p>(6) Erosion formation beyond rills must be avoided.</p> <p>(7) Erosion damages to be repaired as soon as possible and no later than the target set by the Management team.</p> <p>(8) Slopes steeper than 1(V):4(H) or slopes where soils are by nature dispersive or erodible must be stabilised.</p> <p>(9) Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting on berms.</p> <p>(10) Access routes should not traverse slopes with gradients in excess of 8%.</p> <p>(11) Wherever possible, access routes must avoid crossing drainage lines and riparian zones.</p> <p>(12) Drainage lines must not be altered and must be level with the surrounding land once subsistence has occurred.</p> <p>(13) Run-off from roads must be managed in a way to avoid erosion and prevent pollution.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.</p> <p>(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. These requirements must form part of the Soil Conservation and Stockpile management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Hydrology –</b></p>		
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			<p>(1) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(2) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p> <p><b>Soil –</b></p> <p>(1) Disturbance areas to be stripped progressively as required reducing erosion and sediment generation, to reduce the extent of topsoil and utilise stripped topsoil as soon as possible for rehabilitation.</p> <p>(2) The surface of the completed stockpile must be left in a rough condition to promote water infiltration and minimise erosion prior to vegetation establishment;</p> <p>(3) Topsoil stockpiles to have an embankment grade of approximately 1m vertical:4m horizontal (to limit the potential for erosion of the outer pile face);</p> <p>(4) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion.</p> <p>(5) Minimise soil erosion through wind and water</p> <p><b>Biodiversity – Also see Vegetation and Habitat loss</b></p> <p>(1) Limit the complete removal of vegetation.</p> <p>(2) Limit work outside the proposed footprint.</p> <p>(3) Reinforce portions of existing access routes that are prone to erosion or seasonal inundation, create structures or low banks to drain the access road rapidly during rainfall events, yet preventing erosion of the track and surrounding areas. Ensure that water flows are never concentrated in any way as soils are highly erodible.</p> <p>(4) Ensure that runoff from compacted or sealed surfaces is slowed down and dispersed sufficiently to prevent accelerated erosion from being initiated (erosion management plan required).</p>		
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and</p>	<p><b>Vegetation and habitat loss</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(2) Develop and implement a plant species search and rescue management plan.</p>	<p>(1) Develop a plant species search and rescue management plan.</p> <p>(2) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan</p>	<p>Entire Life cycle of project</p>



<p>topsoil stripping for lay down area and all related mining infrastructure</p> <p>6. Storm water runoff management features</p>			<p>(3) Regular inspection of sensitive areas.</p> <p>(4) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(5) Report and record incidents related to unnecessary clearance of vegetation.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicate findings of concern to I&amp;AP.</p> <p>(8) Record keeping of all removed/relocated species.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Avoid clearing areas outside the development footprint.</p> <p>(2) Avoid development in sensitive environments such as areas within pristine or valuable ecological significance.</p> <p>(3) Before the commencement of any vegetation clearance, a search and rescue operation must take place identifying possible protected species as well as indigenous species.</p> <p>(4) An area must be identified to re-instate protected and indigenous areas.</p> <p>(5) If feasible an onsite nursery must be established and maintained.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA describes the duty of care and remediation of environmental damage.</p> <p>(2) A number of the proposed activities fall within or within close proximity to the Sekhukhune Centre of Endemism. Working outside the authorised footprints would require additional authorisation in terms of NEMA and The National Environmental Management: Biodiversity Act (NEMBA) of 2002.</p> <p>(3) The removal or disturbance of listed protected species in terms of NEMBA, the Limpopo Environmental Management Act of 2003, and the National Forest Act of 1998 would require a permit.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Terrestrial Ecology –</b></p> <p>(1) Prior to any new area being impacted by the mine, that area and a suitable buffer will have to be delineated and activities have to be preceded by a very thorough walkthrough, conducted between January and April, followed by the necessary plant Search and Rescue operations where applicable.</p> <p>(2) <b><i>Themeda triandra – Diheteropogon amplexens Grasslands (High sensitivity rating – Avoid</i></b></p>	<p>in compliance with GN R. 1147 of NEMA.</p> <p>(3) Develop and implement a soil conservation management plan.</p> <p>(4) Apply for permits to remove protected species (provincial and national).</p>	
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			<p><b>as far possible)</b></p> <p>(2.1) Development in Grasslands must be limited to the absolute minimum, aiming for minimal to no alteration of the habitat configuration.</p> <p>(2.2) If some of these habitats are impacted or will be altered by the proposed development, all development must be preceded by a thorough footprint investigation followed by a Search and Rescue operation for all plants of conservation concern.</p> <p>(2.3) Components of the proposed development that must under no circumstance be located in this vegetation would include:</p> <p>(2.3.1) Buildings and/or ablution facilities;</p> <p>(2.3.2) Any form of waste/soil/overburden disposal or stockpiling</p> <p>(2.3.3) Tailings dams or processing plants; and</p> <p>(2.3.4) Any form of storage of materials or machinery.</p> <p><b>(3) <i>Cyperus sexangularis</i> – <i>Flueggea virosa</i> Riparian Vegetation (No Go Area – only suitable crossings permissible)</b></p> <p>(3.1) Development in this vegetation/habitat and at least 50 m beyond must be limited to crossings of access roads only, aiming for minimal to no alteration of the habitat configuration.</p> <p>(3.2) Mining/Development in this vegetation/habitat is strongly discouraged.</p> <p>(3.3) Where upstream vegetation will be obliterated or severely denuded, adequate storm water and erosion control measures must be put in place to slow down and disperse runoff volumes and prevent the degradation of other channels and riparian vegetation.</p> <p>(3.4) Where road crossings are necessary, channels may under no circumstance be sealed with any impermeable material, as this will lead to a loss of runoff- and related retention/replenishment of soil moisture reserves, nutrients and seeds.</p> <p>(3.5) Culverts must be designed in a way that water will never be concentrated to a width narrower than the actual channel, causing accelerated erosion during heavy downpours.</p> <p>(3.6) Components of the proposed development that may under no circumstance be located in or within 100 m of any drainage would include:</p> <p>(3.6.1) Buildings and/or ablution facilities;</p> <p>(3.6.2) Any form of waste/soil/overburden disposal or stockpile;</p> <p>(3.6.3) Tailings dams or processing plants; and</p> <p>(3.6.4) Any form of storage of materials or machinery</p> <p><b>(4) <i>Acacia tortilis</i> – <i>Dichrostachys cinerea</i> Dry Mixed Bushveld (Medium Low sensitivity)</b></p> <p>(4.1) It is recommended that if additional space is required in future for any additional infrastructure, this will be situated on the more disturbed sections of this vegetation.</p> <p>(4.2) Community members must be engaged to clear out as much wood as possible from areas to be developed to alleviate the wood-clearing of more valuable large trees in the area.</p> <p>(4.3) Runoff from any sealed or bare surface must be contained to prevent the erosion of the donga</p>		
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			<p>areas and drainage lines below these plains.</p> <p>(4.4) Mine management of the Spitsvale Mine has indicated that they will attempt, where possible, to create more grazing for the Dithamaga community by trying to clear some of the encroached bush to allow perennial grasses to become re-established. For this, it was strongly advised against removing all vegetation with a bulldozer. Rather, the following must be done to break the sealed upper surface and reduce sheet erosion:</p> <p>(4.4.1) With a Ripper only, rip sections of up to 5 m wide along the contour, alternating with ± 5 m of bushveld as it is;</p> <p>(4.4.2) Rips should be at least 500 mm deep, and invasive thorn bushes uprooted to that depth as well to ensure their resprouting capacity from the below-ground lignotuber is also eradicated;</p> <p>(4.4.3) If possible, hand-collected seeds from surrounding areas should be re-introduced to the rips;</p> <p>(4.4.4) Use the cleared thorn bushes to loosely brush-pack the area - with the branching side facing upslope</p> <p><b>(5) <i>Kirkia wilmsii</i> – <i>Terminalia prunioides</i> variable Bushveld (Medium-High sensitivity – Avoid as far possible)</b></p> <p>(5.1) Mining/Development in this vegetation/habitat must be limited to the absolute minimum, aiming for minimal alteration of the habitat configuration.</p> <p>(5.2) This is most important within 100 m of any mountain streams and drainages, to prevent the accelerated erosion of lower-lying plains and fluvial systems.</p> <p>(5.3) If some of these habitats are impacted or will be altered by the proposed development, newly created slopes should preferably be shallower than the original slopes, but never steeper to enable a gradual re-establishment of the woody and herbaceous layer.</p> <p>(5.4) After decommissioning, it will be important to facilitate the re-establishment of a diverse vegetation layer as soon as possible.</p> <p><b>(6) <i>Hippobromus pauciflorus</i> – <i>Rhoicissus tridentata</i> Rock Outcrops (High sensitivity – Treat as No Go Areas as far possible)</b></p> <p>(6.1) Same requirements as stipulated under (5).</p> <p><b>(7) <i>Combretum hereroense</i> – <i>Euclea sekhukhuniensis</i> low bushveld (No Go, only limited access roads permissible)</b></p> <p>(7.1) Mining/Development in this vegetation/habitat is strongly discouraged, aiming for no alteration of the habitat.</p> <p>(7.2) Adjacent (upstream) areas also need to be cleared with care, ensuring that no excessive runoff is directed toward the donga plains.</p> <p>(7.3) Although current dongas may be relatively old and stable, new and accelerated erosion must be monitored and mitigated at all times.</p> <p>(7.4) After decommissioning, it will be important to facilitate the re-establishment of a dense herbaceous vegetation layer as soon as possible where these plains have been impacted.</p> <p>(8) Rehabilitate and re-vegetate all areas that have been disturbed as soon as practically possible.</p> <p>(9) Continually monitor the progress/success of rehabilitation efforts and adapt if rehabilitation targets</p>		
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			<p>are not met in acceptable timeframes</p> <p>(10) As part of decommissioning, all stockpiles must be entirely obliterated and landscaped to merge into the surroundings.</p> <p>(11) Keep main internal access route as planned along existing gravel roads.</p> <p>(12) After the final layout of mining operation components has been approved, conduct a thorough footprint investigation to determine any protected or red data plant species population location and size, and animal burrows:</p> <p>(12.1) Map (by GPS) as far as possible larger concentrations of large trees and protected species that could be avoided or must be relocated;</p> <p>(12.2) Protected trees, succulents and geophytes: must be relocated (trees as far as feasible);</p> <p>(12.3) Animal burrows: must be monitored by EO/ECO prior to ground clearing for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.</p> <p>(13) Strictly restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.</p> <p>(14) Animals accidentally injured by moving vehicles or machinery must be taken to a local veterinarian to be treated or put down in a humane manner.</p> <p>(15) Create designated turning areas and strictly prohibit any off-road driving or parking of vehicles and machinery outside designated areas.</p> <p>(16) Keep the clearing of natural veldt to a minimum.</p> <p>(19) It is desirable that community members be engaged to remove wood suitable for their purposes from areas to be cleared to alleviate the pressure of wood-harvesting currently on other areas of the land portions.</p> <p>(20) All remaining material of cleared shrubs and trees must be shredded and used as mulch.</p> <p>(21) Topsoil (the upper 25 cm of soil) is an important natural resource as it contains most of the geophytic storage organs as well as valuable soil seed resources necessary for re-vegetation; where it must (and then must) be stripped, never mix it with subsoil or any other material, store and protect it separately until it must be re-applied, minimise handling of topsoil.</p> <p>(21) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive Management plan (Appendix E of the Biodiversity Impact Report (<b>Appendix L</b> to this report)).</p> <p><b>Avifauna –</b></p> <p>(1) Leave, as far as possible, as much of the natural indigenous bush undisturbed and in its pristine state.</p> <p>(2) Route connecting roads as close as is possible to already developed sites or roads.</p> <p>(3) Restrict or prohibit any off-road driving in areas of pristine indigenous bush.</p>		
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			<p>(4) Route power lines along these connecting roads, or if possible route them underground.</p> <p><b>Bat Survey –</b></p> <p>(1) Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely necessary.</p> <p>(2) Discourage vehicles from driving through the natural vegetation where mining activities are not taking place.</p> <p>(3) Prohibit mining plant and trucks from washing or dumping material near a water course (wet or dry) to prevent the pollution of natural water bodies.</p> <p>(4) Prohibit any chemical and/or heavy metal from being released into the environment.</p> <p>(5) Manage all waste water and stormwater to prevent pollution to water bodies.</p> <p><b><u>Recommendations as per comments received by the Department of Agriculture, Forestry, and Fisheries:</u></b></p> <p>(1) The <i>Lydenburgia cassinoides</i> (Sekhukhune bushman's tea) is confined to the Sekhukhune District Municipality only, therefore as part of the search and rescue management plan must promote the conservation of this species.</p> <p>(2) When constructing new roads, divergence of roads is recommended where protected trees will be affected.</p> <p>(3) Relocation of protected trees must be adhered to, particularly all trees that are 1m and below. Relocation must be done under the supervision of a specialist to minimise the mortality rate.</p>		
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a water quality monitoring plan.</p> <p>(2) Develop and implement an incident reporting procedure.</p> <p>(3) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(4) Communicate findings of concern to I&amp;AP.</p> <p>(5) Develop and implement a storm water management plan.</p> <p>(6) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(7) A soil conservation and stockpiling plan to be developed and implemented.</p>	<p>(1) Develop a storm water management plan.</p> <p>(2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.</p>	<p>Entire Life cycle of project</p>



<p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p>			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Avoid stockpiling material within drainage lines or in the 1:10 year flood line.</p> <p>(2) Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas.</p> <p>(3) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.</p> <p>(4) Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas, workshops, lay down areas etc.</p> <p>(5) Water from excavations or mining areas either through seepage or collection to be pumped and discharge into a Sedimentation Ponds.</p> <p>(6) Before any water is permitted to enter natural drainage lines, the quality of water must comply with the standards contained in the Water Use Licence conditions.</p> <p>(7) River crossings shall be designed by a registered civil engineer.</p> <p>(8) Measures to avoid or prevent erosion formation must be incorporated into the designs of the infrastructure associated with the river crossings.</p> <p>(9) During construction through drainage lines, the majority of the flow must be allowed to pass down the stream. In stream diversions must be used rather than the construction of new channels.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH,</p>		
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			<p>EC, TDS);Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>);Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p> <p>9.Stores, workshops</p>	Noise generation	Construction & Operational	<p><b>Implement an EMS:</b></p> <p>(1) Develop and implement an Acoustical Measurement &amp; Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (<b>Appendix K</b>). (2) Recording, reporting, and remediating incidents related to noise.</p> <p>(3) Regular inspections of plant.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicate findings of concern to I&amp;AP.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Limit the maximum speed on the haul roads to 60 km/h or less. Road speeds must be kept as consistent as is feasibly possible (i.e. no speed bumps to reduce noise or stop junctions). This will help minimise the use of air brakes as well as reduce required maximum capacity of heavy vehicles during pull off.</p> <p>(2) Roads must be planned so as to reduce heavy vehicles reversing when collecting or dumping at stockpiles/tips etc. (E.g. use of a loop instead of a dead-end road). This will minimise the use of</p>	<p>(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines.</p> <p>(2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.</p>	Before and during all phases on a quarterly basis.



<p>&amp;wash bays</p> <p>11. Fuel operating power generators</p>			<p>reverse alarms on vehicles.</p> <p>(3) Regular inspections and servicing of plant.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) <i>Compliance with the National Noise control regulations.</i></p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Design an Acoustical Measurement &amp; Audit Programme. Note: If there are no noise-sensitive receptors within 1,000m from any mining activities no routine noise monitoring will be required.</p> <p>(2) If feasible the road should be paved or asphalted (e.g. continuous graded asphalt). From an acoustical perspective paver bricks should not be considered. It is likely that routes will be unpaved. The developer should consider maintain these unpaved routes regularly smoothing out irregularities on the routes.</p>		
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<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>6. Storm water runoff management features</p>	<p>Alteration of drainage patterns</p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicate findings of concern to I&amp;AP.</p> <p>(6) Develop and implement a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) A soil conservation and stockpiling plan to be developed and implemented.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Plan the final site layout in a manner as to reduce alteration of drainage patterns.</p> <p>(2) In the event that drainage patterns will be altered, the natural flow to be diverted.</p> <p>(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation and sedimentation.</p> <p>(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence conditions.</p> <p>(5) Channels and drainage systems required to divert the flow of drainage lines to be designed by a civil engineer, taking into consideration the peak volumes and flow.</p> <p>(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to prevent the formation of erosion dongas or rills.</p> <p>(7) Oil separators feeding into the sedimentation ponds must be maintained at all times. Frequent inspections and cleaning of sludge to take place.</p> <p>(8) Sludge from oil separators to be disposed of by an authorised service provider. Records to be kept of such disposal.</p> <p>(9) The quality of the water from the sedimentation ponds to be tested before re-use as dust suppressant. The water quality to be in compliance with requirements stipulated by the WUL (Water</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>	<p>Entire Life cycle of project</p>
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			<p>Use Licence).</p> <p>(10) The sedimentation ponds to be maintained as per the design parameters. No direct discharges are allowed from the sedimentation ponds without the approval from the relevant authorities.</p> <p><b>Legal requirements:</b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b>Specialist recommendations:</b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>);Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with</p>		
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				<p>the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
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<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p><b>Destruction of upstream tributaries and reduction in water in the catchment</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to reinstatement of drainage lines.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicate findings of concern to I&amp;AP.</p> <p>(6) Develop and implement a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) A soil conservation and stockpiling plan to be developed and implemented.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Plan the final site layout in a manner as to reduce the destruction of upstream tributaries.</p> <p>(2) In the event that drainage patterns will be altered, the natural flow to be diverted as to prevent reduction of water in the catchment.</p> <p>(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation and sedimentation.</p> <p>(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence conditions.</p> <p>(5) Channels and drainage systems required to divert the flow of drainage lines to be designed by a civil engineer, taking into consideration the peak volumes and flow.</p> <p>(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to prevent the formation of erosion dongas or rills.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>	<p>Entire Life cycle of project</p>
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			<p>appointed engineers.</p> <p><b>Specialist recommendations:</b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
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<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p><b>Water usage for dust suppression</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Water usage monitoring plan to be developed and implemented.</p> <p>(2) Create awareness of water conservation.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Filtered or treated water from Sedimentation Ponds may be used for dust suppression must they conform to the sediment load requirements or other quality requirements as specified by the Water Use Licence issued by the Department of Water Affairs and sanitation.</p> <p>(2) Monitor water usage and ensure that areas of waste are identified and minimised.</p> <p>(3) Where possible, reuse water from the Sedimentation Ponds for dust suppression on the roads.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p>	<p>(1) Develop and implement a Dust management plan including the monitoring and prevention programme.</p> <p>(2) Develop and implement a water usage record keeping procedure.</p>	<p>Entire Life cycle of project</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p>	<p><b>Influx of alien invasive vegetation</b></p>	<p>Construction</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an alien and invasive control plan</p> <p>(2) Awareness training on the identification of weeds and alien species to employees responsible for the management of these species.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to prevent re-growth.</p> <p>(2) All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and weeds.</p> <p>(3) Chemical removal shall be used in accordance with the manufacturer's specification for weeds where mechanical eradication/control is no longer affective.</p> <p>(4) The type of chemical to be utilised must be determined in consultation with a herbicide consultant and the Environmental Control Officer/Environmental Officer/SHEQ Officer.</p> <p>(5) Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to be manually removed from site.</p>	<p>(1) Develop and implement an alien eradication and control management plan.</p>	<p>Entire Life cycle of project</p>





			<p>(6) The herbicide consultant must have a Pest Control Operators licence.</p> <p>(7) Control the type of material imported to site to ensure that soil contamination, in terms of weed and alien invasive plants does not occur.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Adherence to requirements stipulated by GN R. 598 of NEMBA.</p> <p><b>(2) Section 3: Category 1b Listed Invasive Species (A total number of 6 species were identified – Appendix L):</b></p> <p>(2.1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.</p> <p>(2.2) A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.</p> <p>(2.3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(2.4) A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.</p> <p><b>(3) Section 4. Category 2 Listed Invasive Species (One specie has been identified – Agave sisalana):</b></p> <p>(3.1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.</p> <p>(3.2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.</p> <p>(3.3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.</p> <p>(3.4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(3.5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes</p>		
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			<p>of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.</p> <p>(3.6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.</p> <p><b>(4) Section 5. Category 3 Listed Invasive Species (One specie has been identified – <i>Morus alba</i>):</b></p> <p>(4.1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.</p> <p>(4.2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.</p> <p>(4.3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(5) When using herbicides and pesticides, requirements stipulated in section 7(2)(a)i) of the Fertilizers, farm feeds, agricultural remedies, and stock remedies Act of 1947 must be considered.</p> <p>(6) Requirements for the prohibition of spreading weeds stipulated in section 5 of the Conservation of Agricultural Resources Act (CARA) of 43 must be adhered with.</p> <p>(7) Regulation 15 of GN R.1048 published under CARA must be adhered with and considered as part of the alien invasive species management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Wheels of large machinery should be checked prior to entering the site and cleared of seed material of alien invasive plants if transport routes go through infested areas (especially of species with spiny or bur-like seeds). Such seed must be destroyed.</p> <p>(3) If filling material is to be used, this must be sourced from areas free of invasive species</p> <p>(4) Monitor the establishment of (alien) invasive species and remove as soon as detected, whenever possible before flowers or other regenerative material can be produced. Destruction of regenerative material by burning in a protected area is encouraged.</p> <p>(5) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive</p>		
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				Management plan (Appendix E of the Biodiversity Impact Report ( <b>Appendix L</b> to this report)).		
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>9.Stores, workshops &amp; wash bays</p> <p>11. Fuel operating power generators</p> <p>15. Transport of construction material, mobile plant and equipment to the site</p>	<p><b>CO<sub>2</sub> emissions &amp; Release of noxious gasses</b></p>	<p>Construction &amp; Operational</p>		<p><b>Implement an EMS:</b></p> <p>(1) Develop and maintain a carbon footprint reporting policy.</p> <p>(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plan.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Plant and equipment to function at an optimal level.</p> <p>(2) Where possible lead replacement petrol to be used.</p> <p>(3) Where possible low sulphur containing diesel to be used.</p> <p>(4) All vehicles and equipment must be maintained and serviced according to the manufacturer's specification.</p> <p>(5) Any vehicle, plant or equipment emitting visible emissions from their exhaust systems must be serviced or repaired immediately.</p> <p><b>Legal requirements:</b></p> <p>(1) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies requirements regarding the control of emissions from diesel vehicles used on public roads. These requirements must form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.</p>	<p>(1) Develop and maintain a Carbon footprint reporting policy.</p> <p>(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plan.</p>	<p>Entire Life cycle of project</p>
<p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>	<p><b>Topography and visual alteration</b></p>	<p>Construction</p>		<p><b>Implement an EMS:</b></p> <p>(1) Record keeping of the topography and environmental state before the commencement of any activities.</p> <p>(2) Develop of Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Limit site clearance to approved areas.</p> <p>(2) Re-vegetate, with indigenous and non-invasive species, all cleared or rehabilitated areas</p>	<p>(1) Mine plan in accordance with the MPRDA Regulation 56 section (1) to (8).</p> <p>(2) Adherence to the finalised approved lay out plan.</p> <p>(3) Develop of Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>	<p>Rehabilitation and Decommissioning</p>



				<p>immediately.</p> <p>(3) During rehabilitation ensure that the topography is reinstated as close as possible to the state before commencement of any activities.</p> <p><b>Legal requirements:</b></p> <p>(1) GN R. 1147 of NEMA requires the following documents as part of the authorisation process:</p> <p>(1.1) A annual rehabilitation plan;</p> <p>(1.2) A final rehabilitation, decommissioning and mine closure plan; and</p> <p>(1.3) An environmental risk assessment report.</p>		
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>16. Use of existing drilled / new boreholes</b></p>	<p><b>Water level reduction and contamination</b></p>	<p>Construction &amp; Operational</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to reinstatement of drainage lines.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicate findings of concern to I&amp;AP.</p> <p>(6) Develop and implement a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(9) Create awareness of water conservation.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) River crossings or storm water channels shall be designed by a registered civil engineer.</p> <p>(2) Measures to avoid or prevent erosion formation must be incorporated into the designs of the infrastructure associated with the river crossings.</p> <p>(3) During construction through drainage lines, the majority of the flow must be allowed to pass down the stream. In stream diversions must be used rather than the construction of new channels.</p>	<p>(1) Develop and implement a water management plan and specifically include measures to be implemented to reduce the impact on surface and groundwater reduction.</p> <p>(2) Ensure compliance with the issued WUL requirements.</p> <p>(3) Develop and implement a storm water management plan and specifically address the diversion of "clean" water into the natural drainage lines.</p>	<p>Entire Life cycle of project</p>



			<p>(4) Filtered or treated water from Sedimentation Ponds may be used for dust suppression must they conform to the sediment load requirements or other quality requirements as specified by the Water Use Licence issued by the Department of Water Affairs and sanitation.</p> <p>(5) Monitor water usage and ensure that areas of waste are identified and minimised.</p> <p>(6) Where possible, reuse water from the Sedimentation Ponds for dust suppression on the roads.</p> <p>(7) in the event that RoM product materials requires the usage of water during processing, the holder of the environmental authorisation must ensure that these activities complies with the current authorisation and ensure that a WUL are obtained.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b><i>Geohydrology –</i></b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b><i>Hydrology –</i></b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix</b></p>		
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				<p><b>G).</b> Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Destruction of graves</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an awareness campaign on the protection of social heritage impacts.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) If human remains are uncovered during the course of authorised activities or archaeological work, the excavations affecting the burial must be stopped.</p> <p>(2) SAHRA must then be consulted and depending on the situation, the remains are either covered and left in situ, exposed (but not removed) and studies in situ, or fully excavated and studied with the consent and participation of the interested parties.</p> <p>(3) It is, therefore, advisable that if it is foreseen that any archaeological research will uncover human remains an agreement with the interested and affected parties and a permit for burials be obtained beforehand.</p> <p>(4) A suitable accredited archaeologist must be appointed on a watching brief to monitor the excavation of any grave sites.</p> <p>(5) At the onset of construction or mining operations, all graves that might be affected must be clearly demarcated and if possible fenced off to protect them from any accidental damage, whether they are earmarked for relocation, or not.</p> <p>(6) Should the decision be taken to propose the relocation of the affected graves, a suitably accredited</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>	<p>Entire Life cycle of project</p>	



			<p>and experienced service provider must be appointed to undertake relocation.</p> <p>(7) Relocation of grave relocation is dependent on permission for the action by the close relatives and interested and affected parties from the community, and the requirement is that the developer must assist this community to fulfil their cultural and religious requirements during the process.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Obtain a permit or authorisation to disturb, deface, destroy, or remove protected features and sites in terms of Section 27 (18) of the National Heritage Resources Act (NHRA), No. 25 of 1999 from the South African Heritage Resources Agency (SAHRA).</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage Impact Assessment (HIA) report attached as <b>Appendix R</b>).</p> <p>(2) Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds must be made.</p> <p><b><u>Homestead sites –</u></b></p> <p>(3) A total of five old homestead sites were identified in the proposed mining area and it is anticipated that it would be impacted on by the mining activities.</p> <p>(4) It is recommended that the sites are retained, and that it must be fenced off with danger tape for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the stone walling/physical features.</p> <p>(5) If the sites cannot be retained, it must be documented (mapped and excavated) by an archaeologists after obtaining a permit from SAHRA.</p> <p>(6) If mining takes place in these areas, the community must be consulted to determine if there are any more graves in the region, especially those of young children who, in many cases, are buried inside the old homestead.</p> <p><b><u>Informal burial sites –</u></b></p> <p>(7) A total of nine informal burial sites were identified. All are located inside of or in close proximity to the mining area and it is anticipated that it would be impacted on by the mining activities.</p> <p>(8) If the burial places are retained, it must be fenced off with danger tape for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the graves.</p> <p>(9) If the graves cannot be retained, it must be relocated, but only on condition of following the correct procedures (see Appendix 3 of the HIA attached as <b>Appendix R</b>).</p>		
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<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Degradation of cultural significance heritage sites</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an awareness campaign on the protection of social heritage impacts.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) The position of known sites, as identified by the heritage impact assessment, must be clearly identified and marked and considered in the final site lay out.</p> <p>(2) Such areas shall be marked as no-go areas.</p> <p>(3) Artefacts may not be removed under any circumstances.</p> <p>(4) Do not disturb, deface, destroy or remove protected features and sites, whether fenced or not for the duration of the authorised activity, unless on the approval of the competent authority.</p> <p>(5) Permits shall be obtained from South African Heritage Resource Agency (SAHRA) should any authorised activities affect any world heritage sites or if any areas are to be destroyed or altered.</p> <p>(6) Works must be stopped immediately should any elements of cultural or heritage significance be found.</p> <p>(7) Do not resume works in the area in question without the required permits or authorisation from the competent authority.</p> <p>(8) A qualified and registered archaeologist must be appointed and consulted at such finding to appropriately excavate any artefacts in agreement with the Limpopo Heritage Resource Agency (LPHRA) and the SAHRA.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Obtain a permit or authorisation to disturb, deface, destroy, or remove protected features and sites from the South African Heritage Resource Agency (SAHRA) and Limpopo Heritage Resource Agency (LPHRA).</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage Impact Assessment (HIA) report attached as <b>Appendix R</b>).</p> <p>(2) Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds must be made.</p> <p><b><u>Homestead sites –</u></b></p> <p>(3) A total of five old homestead sites were identified in the proposed mining area and it is anticipated</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>	<p>Entire Life cycle of project</p>
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			<p>that it would be impacted on by the mining activities.</p> <p>(4) It is recommended that the sites are retained, and that it must be fenced off with danger tape for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the stone walling/physical features.</p> <p>(5) If the sites cannot be retained, it must be documented (mapped and excavated) by an archaeologists after obtaining a permit from SAHRA.</p> <p>(6) If mining takes place in these areas, the community must be consulted to determine if there are any more graves in the region, especially those of young children who, in many cases, are buried inside the old homestead.</p> <p><b>Industrial/Infrastructural heritage –</b></p> <p>(7) A single site defined as of industrial/infrastructural heritage was identified.</p> <p>(8) It is recommended that the irrigation system must be documented (photographed and mapped) in before mining activities takes place.</p>		
4. Onsite Clinic	Medical Waste generation	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Waste Management plan.</p> <p>(2) Develop and implement a waste recoding procedure.</p> <p>(3) Develop and implement a Health and Safety management plan, including the handling of medical waste.</p> <p>(4) Regular inspections of designated waste management area and/or facilities.</p> <p>(5) Report and record of waste related incidents.</p> <p>(6) Continuous awareness training on Recycling, Reduction, Re-use, and avoidance of waste.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Ensure that all first aid facilities are equipped with specialised medical waste disposal bins.</p> <p>(2) Appoint a specialised and suitably accredited medical waste service provider.</p> <p>(3) Ensure that at no circumstance any medical waste generated from an first aid incident are mixed into general or hydrocarbon contaminated waste.</p> <p>(4) Ensure all personnel are made aware of the dangers of medical waste.</p>	<p>(1) Develop a Health and Safety management plan specifically addressing the management of medical waste.</p> <p>(2) Develop a management plan for the operation of the on-site Clinic.</p> <p>(3) Develop and implement a detailed Waste management plan.</p>	Entire Life cycle of project



			<p>(5) Record must be kept of all medical waste generated throughout the entire life cycle of the project.</p> <p>(6) Safe disposal certificates to be obtained and kept on record.</p> <p>(7) All appointed first aid personnel must be trained in management of medical waste.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Requirements for management of blood products stipulated in GN R. 1935 of the Human Tissue Act of 1983, must be incorporated into the Spitsvale Mine Health and Safety management plan.</p> <p>(2) Requirements for the disposal of bodies and tissue as stipulated in GN R. 2878 of the Human tissue Act of 1983, must be incorporated into the Spitsvale Mine Health and Safety management plan.</p> <p>(3) Requirements for the destruction of medicines as stipulated in GN R. 1965 of the Medicines and related substances control Act, must be incorporated into the Spitsvale Mine Health and Safety management plan</p>		
<p>4. Onsite Clinic</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p> <p>12. Lighting</p>	<p>Electricity usage</p>	Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Calculate and record the carbon emissions that may arise from the authorised activities.</p> <p>(2) Monitor the carbon footprint of the project throughout the entire life cycle.</p> <p>(3) Develop an awareness campaign on power saving and electricity usage.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Keep record of the carbon emissions produced on site to monitor the carbon footprint of the project.</p> <p>(2) Ensure that all unnecessary office equipment, air cons, and lights are switched off at the end of each shift.</p> <p>(3) If feasible, the use of solar powered geysers will allow for the reduction in contributing to the carbon footprint of the project.</p> <p>(4) Consider and investigate the feasibility of switching to "green" energy options.</p>	<p>(1) Develop and implement an electricity usage monitoring programme.</p> <p>(2) Develop and implement a carbon footprint reporting policy.</p>	Entire Life cycle of project
<p>4. Onsite Clinic</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres,</p>	<p>Domestic water usage</p>	Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a water quality monitoring plan.</p> <p>(2) Create awareness of water conservation.</p> <p><b><u>On-site mitigation measures:</u></b></p>	<p>(1) Develop and implement a water usage record keeping procedure.</p> <p>(2) Develop and implement an infrastructure maintenance programme to include frequent inspections of water pipes and taps.</p>	Entire Life cycle of project



<p>offices and kitchen facilities</p>			<p>(1) Ensure that all taps and pipes are maintained to avoid spills or leaks.</p> <p>(2) Monitor water use and ensure that areas of waste are identified and minimised.</p> <p>(3) Repair identified leaks and address issues of water wastage as soon as these are identified.</p> <p>(4) Where possible reuse water on site for dust suppression.</p>		
<p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>	<p>General waste generation &amp; Littering</p>	<p>Construction &amp; Operational</p>	<p><b>Implement an EMS:</b></p> <p>(1) Develop and implement a waste management plan with the focus on reuse, reduce, recycle, or avoid.</p> <p>(2) Develop and maintain of a waste disposal record keeping system.</p> <p>(3) Regular inspections of designated waste management area and/or facilities.</p> <p>(4) Report and record of waste related incidents.</p> <p>(5) Continuous awareness training on Recycling, Reduction, Re-use, and avoidance of waste.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Characterise and quantify all waste streams associated to the authorised activities in terms of quantity, hazard, generation frequency and recyclability and define and implement disposal options as specified in the waste management plan.</p> <p>(2) As part of the characterisation define opportunities for source reduction, as well as reuse and recycling as opposed to simply disposing waste.</p> <p>(3) Ensure segregation of hazardous wastes from non-hazardous.</p> <p>(4) Sealable bins and containers must be made available for the storage of all streams of waste.</p> <p>(5) During the construction phase, temporary storage of construction waste to be stored in a bunded designated area.</p> <p>(6) Waste will not be stored longer than specified by the waste regulations. If storage exceeds the threshold stipulated by the regulations a waste management licence must be obtained.</p> <p>(7) All waste materials must be removed off site by a suitable and registered waste service provider.</p> <p>(8) All waste to be disposed off at a suitably registered waste disposal facility.</p> <p>(9) Proof of disposal to be obtained and kept on record.</p> <p>(10) Maintain a waste register for materials removed from site, indicating type, quantity, date, haulage</p>	<p>(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.</p>	<p>Entire Life cycle of project</p>



			<p>contractor, delivery point, and safe disposal certificates.</p> <p>(11) All waste receptacles to be clearly labelled according to type.</p> <p>(12) Where possible, recyclable waste including glass, paper, and plastic must be separated, stored and recycled where possible.</p> <p>(13) Waste oil and scrap metal must also be recycled if possible.</p> <p>(14) All employees or contractors must be informed about the necessity of using waste drums.</p> <p>(15) No littering will be allowed and a daily site clean-up will be initiated.</p> <p>(16) All domestic refuse generated by staff and sub-contractors must be disposed at a registered waste disposal facility by a suitably registered service provider on a regular basis (i.e. weekly).</p> <p>(17) Measures to ensure that solid waste is transported as to avoid waste spills <i>enroute</i> must be implemented.</p> <p>(18) Waste bins must be emptied on a regular basis as to ensure bins do not overflow.</p> <p>(19) Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof.</p> <p>(20) DO not dump waste of any nature, or any foreign material into any drainage line or stream. A strict no dumping policy must be communicated to all staff and sub-contractors.</p> <p>(21) During transportation of waste, all waste service providers must comply with the codes of practice and guidelines for licensing of waste transport vehicles and the regulation and monitoring of transport operations.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA) of 2008 are incorporated in the Waste Management Plan.</p> <p>(2) GN R. 634 list a number of requirements related to Waste classification and management. These requirements as stipulated in the regulations must be incorporated into the Waste Management Plan.</p> <p>(3) GN R. 921 list a number activities that requires a Waste Management Licence in terms of NEMWA. Listed activity number 11 ("The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MPRDA (Act 28 of 2002)") will require a waste management licence in terms of the regulations.</p> <p>(4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the National Waste Information System.</p>		
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			<p>(5) GN R. 635 sets the National norms and standards for the assessment of waste for landfill. The procedures for determining the class of waste for landfill must be incorporated into the Waste Management plan.</p> <p>(6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These requirements must be considered when disposing waste to landfill.</p> <p>(7) GN R. 926 stipulates the norms and standards associated to the storage of waste. These requirements must be incorporated in the Waste Management Plan.</p> <p>(8) All waste tyres generated on site must be managed according to the Waste tyre regulations published under the Environment Conservation Act of 1989.</p>		
7. Water storage facilities	Improper water storage management	Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Water usage monitoring plan to be developed and implemented.</p> <p>(2) Create awareness of water conservation.</p> <p>(3) Regular inspections of water storage facilities.</p> <p>(4) Report and record of water management related incidents.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Filtered or treated water from Sedimentation Ponds may be used for dust suppression should they conform to the sediment load requirements or other quality requirements as specified by the Water Use Licence issued by the Department of Water Affairs and sanitation.</p> <p>(2) Monitor water usage and ensure that areas of waste are identified and minimised.</p> <p>(3) Where possible, reuse water from the Sedimentation Ponds for dust suppression on the roads.</p> <p>(4) Water may only be abstracted from the approved abstraction points once all grey water or run-off water complying with the quality requirements has been utilised for the purposes of dust suppression.</p> <p>(5) The volume of water abstracted may not exceed the limits stipulated by DWAS by more than 5% on an annual basis.</p> <p>(6) Water storage facilities to be inspected on a weekly basis to ensure no leaks or contamination of water source.</p> <p>(7) Water storage facilities and infrastructure to be maintained to a good working condition at all times.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or</p>	(1) Develop and implement a water management plan specifically addressing the storage of water as well as the frequent inspections of storage facilities.	Entire Life cycle of project



<p>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</p> <p>9. Stores, workshops &amp; wash bays</p> <p>10. Ablutions &amp; change house with sewage treatment plant</p> <p>11. Fuel operating power generators</p> <p>13. Fuel storage</p>	<p>Contamination of water resources</p>	<p>Operational</p>		<p>within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p><b>Implement an EMS:</b></p> <p>(1) Develop and implement a water monitoring program.</p> <p>(2) Develop and implement an Integrated Water and Waste Management Plan (IWWMP)</p> <p>(3) Develop and implement a storm water management plan.</p> <p>(4) Regular inspections of all areas posing a risk of contaminating water resources.</p> <p>(5) Report and record all related incidents according to a developed procedure.</p> <p>(6) Develop and implement an emergency preparedness plan.</p> <p>(7) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(8) Communicate findings of concern to I&amp;AP.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) All sources of process water must be identified and quantified for the life cycle of the authorised activities.</p> <p>(2) A wastewater management system must be installed complying with regal requirements.</p> <p>(3) A water use licence for waste water storage facilities to be obtained.</p> <p>(4) All waste water management facilities to be designed by a qualified engineer.</p> <p>(5) Wash bays, service areas, and fuel storage areas may not be located within the 1:100 year flood line or horizontal distance of 100 m (whichever is greater) of a watercourse or drainage line.</p> <p>(6) No environmentally harmful detergents may be used.</p> <p>(7) Workshops, refuelling depots and washing areas shall be bunded.</p> <p>(8) All bunded areas to be constructed in a way as to avoid seepage to the surrounding environment as well as be able to contain its content to a capacity of 110%.</p> <p>(9) Water from wash bays, service areas and fuel storage areas must be discharged into oil separators and sumps.</p> <p>(10) Oils collected in this manner must be retained in a safe holding tank and removed from site by specialist oil recycling company or disposal at approved waste disposal sites.</p>	<p>(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water monitoring schedule according to the water management plan.</p> <p>(3) Ensure compliance with the WUL conditions.</p> <p>(4) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.</p>	<p>Entire Life cycle of project</p>
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			<p>(11) No drainage from fuel storage areas to be permitted.</p> <p>(12) Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural environment.</p> <p>(13) Any contaminated storm water and other run-off from dirty areas to be disposed off in the suitably designed Sedimentation Ponds .</p> <p>(14) Any spill which may contaminate water must be treated according to the approved spill management procedure.</p> <p>(15) Contain oil or fuel spills in water using an approved oil absorbent fibre.</p> <p>(16) Grey water not deemed suitable for dust suppression must be disposed of with other waste water in the designated and suitably designed PCD.</p> <p>(17) Waste water as well as spilled fuel collected within bunded areas and refuelling areas shall be disposed of or treated as hazardous waste.</p> <p>(18) Avoid unnecessary alteration of drainage lines.</p> <p>(19) Avoid locating lay down areas, wash bays, workshops etc. within the 1:50 year flood line or within horizontal distance of 100 m (whichever is greater) of a water course.</p> <p>(20) Contain contaminated runoff from dirty areas (i.e. lay down areas, RoM and product stockpile areas, workshops, fuelling bays etc.) in suitable designed Sedimentation Ponds .</p> <p>(21) Contaminated runoff to be treated and re-used for processing water or dust suppression in dirty areas only when complying with legal requirements or water quality standards specified in the Water Use Licence.</p> <p>(22) Do not locate any ablution facilities, chemical toilets, sanitary convenience, septic tanks, or French drains within the 1:100 year flood line, or within a horizontal distance of 100 m (whichever is greater) of any watercourses.</p> <p>(23) Do not allow the use of any drainage line or wetland for swimming, bathing, or cleaning of clothing, tools or equipment.</p> <p>(24) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.</p> <p>(25) Deflect any unpolluted water/runoff away from any dirty area.</p> <p>(26) Ensure that no storm water is allowed to enter any drainage installation for the reception, conveyance, storage, and or treatment of sewage.</p>		
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			<p>(27) Before any water is permitted to enter natural drainage lines, the quality of the water must comply with the standards contained within the Water Use Licensing conditions authorised by the DWAS.</p> <p>(28) Ensure water passing through vehicle wash bays and workshops pass through oil separators before passing into conservancy tank.</p> <p>(29) Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing siltation of streams and downstream dams.</p> <p>(30) Oil separators feeding into the sedimentation ponds must be maintained at all times. Frequent inspections and cleaning of sludge to take place.</p> <p>(31) Sludge from oil separators to be disposed of by an authorised service provider. Records to be kept of such disposal.</p> <p>(32) The quality of the water from the sedimentation ponds to be tested before re-use as dust suppressant. The water quality to be in compliance with requirements stipulated by the WUL (Water Use Licence).</p> <p>(33) The sedimentation ponds to be maintained as per the design parameters. No direct discharges are allowed from the sedimentation ponds without the approval from the relevant authorities.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Obtain a Water Use Licence from the DWAS.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b><i>Geohydrology –</i></b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS); Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>); Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project</p>		
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			<p>area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p>	Smell nuisance	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP).</p> <p>(2) Frequent inspections of areas posing a possible risk of causing smell nuisance.</p> <p>(3) Develop and implement an incident response plan.</p> <p>(4) Report and record all related incidents according to a developed procedure.</p> <p>(5) Develop and implement an emergency preparedness plan.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicate findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Putrescible waste must be handled, stored, and disposed of before the probability of it generating odours.</p>	<p>(1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets.</p> <p>(2) Develop and implement an Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste.</p> <p>(3) Develop and implement a Waste Management plan.</p>	Entire Life cycle of project



				<p>(2) Chemical toilets must be emptied/ serviced on a regular basis. Proof of this must be obtained and kept on record.</p> <p>(3) Sewage tanks must be emptied on a regular basis. Proof of this must be obtained and kept on record.</p> <p>(4) Oil separators feeding into the sedimentation ponds must be maintained at all times. Frequent inspections and cleaning of sludge to take place.</p> <p>(5) Sludge from oil separators to be disposed of by an authorised service provider. Records to be kept of such disposal.</p> <p>(6) The quality of the water from the sedimentation ponds to be tested before re-use as dust suppressant. The water quality to be in compliance with requirements stipulated by the WUL (Water Use Licence).</p> <p>(7) The sedimentation ponds to be maintained as per the design parameters. No direct discharges are allowed from the sedimentation ponds without the approval from the relevant authorities.</p>		
<p>9.Stores, workshops &amp; wash bays</p> <p>11. Fuel operating power generators</p> <p>13. Fuel storage</p>	<p><b>Chemical Fires</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Hazardous substances management plan.</p> <p>(2) Develop an emergency procedure addressing in particular the management of chemical fires and spill response.</p> <p>(3) Report and record all incidents related to chemical fires.</p> <p>(4) Employees must be trained on emergency response procedures required to counter the nature and hazards of an accidental release.</p> <p>(5) Employees must be familiar with and have received the appropriate training regarding the handling and storage practices, for all containers with which they will come into contact.</p> <p>(6) Document the types and amounts of hazardous materials present on the project site (including for example the name and description, classification, regulatory reporting threshold, quantities, characteristics, analysis of potential consequence, identification of location, details of responsible persons, detail of availability of spill response equipment etc.).</p> <p>(7) The emergency response procedure must describe response activities in the event of a spill, release, or other chemical emergency and include the internal and external notification procedure, specific responsibilities of individuals or groups, decision process for assessing severity of the release, and determining appropriate actions, facility evacuation routes, and post event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response</p>	<p>(1) Develop and implement a fire prevention plan that includes measures of prevention and response to chemical fires.</p> <p>(2) Develop an emergency preparedness procedure and include the process to be followed in case of a chemical fire.</p> <p>(3) Develop a Hazardous substances management plan.</p> <p>(4) Develop a frequent inspection programme to include inspections of hazardous substances storage facilities.</p>	<p>Entire Life cycle of project</p>	



			<p>equipment.</p> <p>(8) Procedures must be prepared for informing the public and emergency response agencies, documenting first aid and emergency medical treatment, taking emergency response actions, reviewing and updating the emergency response plan to reflect changes, and using, inspecting, testing, and maintaining the emergency response equipment.</p> <p>(9) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(10) Communicate findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Reactive, flammable, and explosive materials must be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion.</p> <p>(2) Ensure storage of incompatible materials (acids, basis, flammables, oxidisers, reactive chemical) in separate areas, and with containment facilities separating material storage areas.</p> <p>(3) Ensure the provision of material-specific storage for extremely hazardous or reactive materials.</p> <p>(4) Ensure the use of flame arresting devices on vents from flammable storage containers.</p> <p>(5) Ensure the provision of grounding and lightning protection.</p> <p>(6) Ensure the storage of hazardous materials in an area of the facility separated from the main authorised activities.</p> <p>(7) Ensure that all personnel that use or handle hazardous materials are trained in the use and potential dangers of the materials.</p> <p>(8) Implement all measures detailed in the spill prevention procedure in the event of a spill.</p> <p>(9) Prevent uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard.</p> <p>(10) Implement management controls (procedures, inspections, communicates, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures. (11) Store all hazardous (reactive, flammable, corrosive and toxic) materials in clearly identified, fit-for-purpose containers or vessels.</p> <p>(12) Chemical products must be secured when not needed to prevent tampering and vandalism.</p> <p>(13) Provide warning notices, fire fighting facilities and protection from weather damage.</p>		
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			<p>(14) Each shift supervisor or safety officer is to report on the integrity of the hazardous material storage.</p> <p>(15) Keep products in their original container (unless they are not re-sealable) with all stored products and containers being labelled, and original labels and MSDS retained.</p> <p>(16) Label containers so that the hazard nature of the material is clear.</p> <p>(17) Obtain Material Safety Data Sheets (MSDS) for all chemicals before use and all materials must be handled according to the instructions.</p> <p>(18) Transporters of hazardous materials must ensure that the vehicle is suitable and registered for the purpose it is being used.</p> <p>(19) Transport vehicles must display clear markings in English indicating the nature of the materials being carried, what to do in the event of an emergency, and an emergency telephone number (24 hour) of a responsible person who must provide advice in the event of an emergency.</p> <p>(20) No combustible material (e.g. wood, rags, carton boxes, etc.) are to be kept in the presence of flammable liquids.</p> <p>(21) "No Open Flames" and "No smoking" symbolic signs are to be displayed in the vicinity of the flammable liquid storage areas.</p> <p>(22) Flammable liquids are to be issued only on a need-to-use-basis and strict control is to be exercised to ensure that persons do not draw more than what is needed for the specific job.</p> <p>(23) All cables are to be grounded as appropriate.</p> <p>(24) An adequate number (according to safety regulations) and type of fire fighting equipment is to be available in the close vicinity of the flammable liquid store.</p> <p>(25) Flammable liquid stores are to be well ventilated and free of explosive vapours.</p> <p>(26) Flammable liquid containers in stores are to be clearly marked or labelled as to their contents.</p> <p>(27) Locations are to support MSDS information and handling/storage instructions.</p> <p>(28) Flammable liquid tanks are to be properly earthed in order to prevent static electricity accumulating.</p> <p>(29) Drainage points on flammable liquid tanks are to be provided with threaded caps or blanking plates.</p> <p>(30) Bund walls are to surround storage tanks containing flammable liquids and these must be able to contain the entire volume of the contents plus 10% in case of spillage.</p>		
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			<p>(31) Earthing is to be tested regularly (according to safety regulations).</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Bulk storage facilities of flammable liquids to be approved by the provincial fire inspector.</p> <p>(2) Section 30 of the National Environmental Management Act (NEMA), Act 107 of 1998 describes measures to be taken to control emergency incidents. These requirements must be included in the developed Emergency Response procedure.</p> <p>(3) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of incidents involving Hazardous substances. These requirements must also be included in the Emergency response procedure.</p> <p>(4) GN R. 1237 published under the Mine Health and Safety Act of 1996 describes the requirements for the storage of hazardous substances. These requirements must be incorporated into the Hazardous substances management plan.</p> <p>(5) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition of Hazardous chemicals. These requirements must be considered as part of the mine acquisition process.</p> <p>(6) Regulation 277, 273, and 279 of GN R. 225 of the National Road traffic Act of 1996 describes the requirements of transporting hazardous waste. These requirements must be incorporated in both the Hazardous substances management plan and the Waste Management plan.</p> <p>(7) Regulation 277 and 273 of GN R. 225 of the National Road traffic Act of 1996 describes the Loading and offloading of dangerous goods. These requirements must be addressed in the Hazardous substances management plan.</p> <p>(8) All requirements described in the Hazardous substance Act of 1973 must be included in the Hazardous substances management plan.</p> <p>(9) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the National Environmental Management Act.</p> <p>(10) Requirements stipulated in SANS 10089-1:2008 (above ground storage facilities for petroleum products) must be incorporated into the Hazardous Substance Management plan and be implemented on site.</p> <p>(11) Requirements stipulated by SANS 301: 2011 (Storage tank facilities for hazardous chemicals) must be incorporated into the Hazardous Substance Management plan and be implemented.</p>		
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<p><b>12. Lighting</b></p>	<p><b>Light pollution</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Monitor the affects of possible light pollution.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Promote the usage of light sources with a high luminous effectiveness.</p> <p>(2) Promoting the usage of full cut-off lighting fixtures.</p> <p>(3) On-site lights to be spaced appropriately for maximum efficiency.</p> <p>(4) Ensure that the number of luminaries being used as well as the wattage of each laminar match the needs of the particular application (based on local lighting design standards).</p> <p>(5) Ensure that during nighttimes only essential lights are switched on.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Bat survey -</b></p> <p>(1) Erect security lights/spot lights only near infrastructure/where absolutely necessary.</p> <p>(2) Mitigate night time noise to as low as possible, particularly during peak foraging times.</p> <p>(3) Restrict blasting activities to daytime hours.</p>	<p>(1) Biennial investigation of the impact of Light pollution to nocturnal species.</p>	<p>Entire Life cycle of project</p>
<p><b>13. Fuel storage</b></p>	<p><b>Emission of noxious fumes</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Health and Safety management plan addressing the proper storage, management, handling, and transport of hazardous substances.</p> <p>(2) All personnel to be trained in the handling, storage, management, and transport of hazardous substances.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) All personnel must wear issued PPE at all times as indicated by safety signs.</p> <p>(2) Fuel storage facilities must be inspected on a regular basis.</p> <p>(3) Facilities must be well ventilated.</p> <p>(4) Spill prevention measures to be implemented at all times.</p> <p>(5) Fire fighting equipment such as fire extinguishers must be made available and be inspected on a</p>	<p>(1) Develop and implement a Hazardous substance management plan addressing adherence to applicable SANS standards for the storage of fuel.</p> <p>(2) Develop and implement an infrastructure inspection schedule and programme and include the inspections of fuel storage facilities.</p> <p>(3) Develop and implement a Health and Safety Management plan.</p> <p>(4) Develop an Emergency preparedness plan addressing prevention and mitigation of incidents.</p>	<p>Entire Life cycle of project</p>



			<p>regular basis.</p> <p>(6) A spill kit must be made available at all time.</p> <p>(7) All spills to be cleaned immediately.</p> <p>8) Storage facilities must be inspected on a regular basis.</p> <p>(9) All leaks to be repaired immediately.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Bulk storage facilities of flammable liquids to be approved by the provincial fire inspector.</p> <p>(2) Section 30 of the National Environmental Management Act (NEMA), Act 107 of 1998 describes measures to be taken to control emergency incidents. These requirements must be included in the developed Emergency Response procedure.</p> <p>(3) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of incidents involving Hazardous substances. These requirements must also be included in the Emergency response procedure.</p> <p>(4) GN R. 1237 published under the Mine Health and Safety Act of 1996 describes the requirements for the storage of hazardous substances. These requirements must be incorporated into the Hazardous substances management plan.</p> <p>(5) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition of Hazardous chemicals. These requirements must be considered as part of the mine acquisition process.</p> <p>(6) Regulation 277, 273, and 279 of GN R. 225 of the National Road traffic Act of 1996 describes the requirements of transporting hazardous waste. These requirements must be incorporated in both the Hazardous substances management plan and the Waste Management plan.</p> <p>(7) Regulation 277 and 273 of GN R. 225 of the National Road traffic Act of 1996 describes the Loading and offloading of dangerous goods. These requirements must be addressed in the Hazardous substances management plan.</p> <p>(8) All requirements described in the Hazardous substance Act of 1973 must be included in the Hazardous substances management plan.</p> <p>(9) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the National Environmental Management Act.</p> <p>(10) Requirements stipulated in SANS 10089-1:2008 (above ground storage facilities for petroleum</p>		
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			<p>products) must be incorporated into the Hazardous Substance Management plan and be implemented on site.</p> <p>(11) Requirements stipulated by SANS 301: 2011 (Storage tank facilities for hazardous chemicals) must be incorporated into the Hazardous Substance Management plan and be implemented.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Develop a detailed air quality management plan (focusing on sources of dust located in close proximity to the residential receptors within the project boundary) ensuring adherence to thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR) (<b>Appendix J</b>) prior to the commencement of operations.</p> <p>(2) Controls to reduce emissions from unpaved roads must include vehicle restrictions which limit the speed, weight and number of vehicles on the road, surface improvements (paving or adding gravel to the road), and surface treatments (wet suppression or surface treatments).</p> <p>(3) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road per given time</p> <p>(4) Hauling activities must be strictly restricted to designated hauling routes.</p> <p>(5) Regular maintenance of the vehicles/trucks (engines) must be undertaken to ensure optimal efficiency of the engine.</p> <p>(6) Regular inspections must be carried out on the vehicles/trucks (engines, tyres, etc.) and the route to ensure both are in good quality.</p> <p>(7) Engines of the trucks must not be left running whilst not in use.</p> <p>(8) Clean fuels and fuel efficient vehicles/trucks/mobile equipment must be considered for use where possible.</p>		
14. Employment of workers and procurement of construction materials.	Loss of farm labour	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations.</p> <p>(2) Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	Entire Life cycle of project





				<p><b><u>Legal requirements:</u></b></p> <p>(1) Adherence with the South African Employment act of 2002.</p>		
Population Influx – Pressure on Resources	Construction & Operational			<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) The employment of local labour to be promoted.</p> <p>(2) Ensure housing of employees on existing infrastructure.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Reduce overcrowding by collaborating with relevant departments on housing requirements i.e. total square meters v.s number of rooms, indoor cooking practices, etc.</p> <p>(2) Improve vaccination coverage by collaborating with the relevant departments on awareness creation around vaccination to communicable diseases for vulnerable sub-populations such as children and old people.</p> <p>(3) Reduce the prevalence of communicable diseases by collaborating with relevant departments, schools for awareness creation and improved understanding of factors exacerbating communicable diseases, including coping strategies that result in behaviour change.</p> <p>(4) Improve capacity of health services by:</p> <p>(4.1) collaborating with clinics to identify opportunities for assisting with health services, specifically in terms of resources and maintenance issues;</p> <p>(4.2) On-site health facility operational at the onset of construction;</p> <p>(4.3) Assisting with the development of health-effect prevention plan to increase community resilience by improving coping capability reducing exposure and reducing susceptibility of vulnerable sub-populations.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	Entire Life cycle of project
Population Influx – Social Pathologies	Construction & Operational			<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop a grievance reporting procedure.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	Entire Life cycle of project



			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Implement HIV/AIDS and substance abuse awareness.</p> <p>(2) Make HIV/AIDS/STD prevention programmes a condition of contract for suppliers/sub-contractors.</p> <p>(3) Control access at site to prevent the presence of sex workers.</p> <p>(4) Establish clear rules and regulations for access to the mine site.</p> <p>(5) Work with local health service providers to provide services and health surveys also on substance abuse.</p> <p>(6) Establish liaison structures with local police and local community policing forums.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Reduce substance abuse and bad moral choices by conducting substance-abuse prevention education programmes.</p> <p>(2) Establish appropriate recreation facilities, taking special cognisance of workers without families.</p> <p>(3) Prevent transmission, reduce prevalence and mitigate the effects of STD's by developing an awareness and prevention campaign targeting the work force. Include requirements for case finding and treatment of curable STI's.</p> <p>(4) Develop a peer educator's programme that includes the distribution of condoms and provision of Voluntary Counselling and testing.</p> <p>(5) Increase awareness about lifestyle diseases by providing educational hand-outs for use in local clinics and schools.</p> <p>(6) Reduce the adverse impacts of non-communicable diseases in the workforce by providing programmes to support the psychosocial, emotional and mental health of the workforce. These programmes to include the screening for cancer, diabetes, and high blood pressure.</p> <p>(7) Develop an awareness programme on lifestyle behaviours including eating habits, exercise, and responsible social choices.</p>		
	<p><b>Population Influx – Community Conflict</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop and implement a social development plan.</p> <p>(3) Develop and implement a skills development program.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	<p>Entire Life cycle of project</p>



			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Promote an open and honest relationship with the local community.</p> <p>(2) Ensure the employment of local labour force and service providers or sub-contractors.</p> <p>(3) Promote community involvement through supporting local development projects.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Improve social cohesion in the community by collaborating with the authorities to establish a system to monitor violence and assess community cohesion related to project activities.</p> <p>(2) Conduct violence-prevention education programmes.</p>		
	<b>Health and Safety of employees</b>	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Health and Safety plan.</p> <p>(2) All employees to be trained in health and safety in the work place.</p> <p>(3) Develop and implement an employee training program.</p> <p>(4) Keep and maintain a record of all training of employees.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Ensure compliance to the relevant Occupational Health and safety act and regulations.</p> <p>(2) All employees or sub-contractors entering site must be inducted to ensure the awareness of the developed health and safety plan.</p> <p>(3) A health and safety representatives to be appointed.</p> <p>(4) Regular inspections and observations of on-site activities shall take place.</p> <p>(5) All incidents to be reported, recorded, investigated, and mitigated.</p> <p>(6) Where required, adequate safety requirements for all areas to be clearly indicated.</p> <p>(7) Employees or sub-contractors must be informed as to what required PPE is applicable in working sections.</p> <p>(8) All site personnel and sub-contractors to be fully equipped with appropriate PPE at all times.</p> <p>(9) Safety signs to be provided in areas considered as high risk zones.</p>	(1) Develop and implement a Health and Safety Management plan.	Entire Life cycle of project



			<p>(10) Adequate first aid services must be provided.</p> <p>(11) Ongoing health and safety awareness campaigns must be promoted.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Develop a Mine Health and Safety Management plan in accordance with the following legislation:</p> <ul style="list-style-type: none"> <li>• Occupational Health and Safety Act of 2004; and</li> <li>• Mine Health and safety Act of 1996.</li> </ul> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Increase awareness on safety by presenting Awareness training and education on safety risks potentially experienced by employees that are associated with overcrowding including, paraffin poisoning, fires, burns, road safety.</p> <p>(2) Involvement in awareness campaigns at schools about traffic safety, paraffin, pesticide and domestic fuel-use safety.</p> <p>(3) Reduce injuries on site by managing access control to site.</p> <p>(4) All personnel or visitors to be trained on safety issues before entering site.</p> <p>(5) Reduce occupational sources of injuries and accidents by providing training and regular refresher courses for employees on safety issues.</p> <p>(6) Adhere to the Occupational and Mine Health and safety acts.</p> <p>(7) Form a Safety and health forum to discuss success and failure. These forums meetings to be held on a regular basis.</p>		
	<b>Job Creation and Skills Training</b>	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop a grievance reporting procedure.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Maximise and monitor local recruitment where required.</p> <p>(2) Consult local labour recruitment offices.</p> <p>(3) Prevent nepotism/corruption in local recruitment structures.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	Entire Life cycle of project



			<p>(4) Promote employment of women and youth.</p> <p>(5) Train locally-recruited construction workers for longer-term employment where possible.</p> <p>(6) Develop a register of local SMMEs.</p> <p>(7) Linkages with skills Development/ SMME Development institutions.</p> <p>(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR projects.</p> <p>(9) Support economic diversification through development of alternative markets.</p> <p>(10) Collaborate with adjacent mining companies to develop and implement sustainable community projects.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Improving financial skills in employees and extended families, and community by conducting socio-economic education programmes and teaching financial skills.</p>		
<p><b>Job Creation (Multiplier affect) and Population Influx</b></p>	<p>Construction &amp; Operational</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop a grievance reporting procedure.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Maximise and monitor local recruitment where required.</p> <p>(2) Consult local labour recruitment offices.</p> <p>(3) Prevent nepotism/corruption in local recruitment structures.</p> <p>(4) Promote employment of women and youth.</p> <p>(5) Train locally-recruited construction workers for longer-term employment where possible.</p> <p>(6) Develop a register of local SMMEs.</p> <p>(7) Linkages with skills Development/ SMME Development institutions.</p> <p>(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR projects.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	<p>Entire Life cycle of project</p>



				(9) Support economic diversification through development of alternative markets.  (10) Collaborate with adjacent mining companies to develop and implement sustainable community projects.		
<b>Operational Phase</b>						
17. Employment of workers	Loss of farm labour	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations.</p> <p>(2) Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Adherence with the South African Employment act of 2002.</p>	(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.	Entire Life cycle of project
	Population Influx – Pressure on Resources	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) The employment of local labour to be promoted.</p> <p>(2) Ensure housing of employees on existing infrastructure.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Reduce overcrowding by collaborating with relevant departments on housing requirements i.e. total square meters v.s number of rooms, indoor cooking practices, etc.</p> <p>(2) Improve vaccination coverage by collaborating with the relevant departments on awareness creation around vaccination to communicable diseases for vulnerable sub-populations such as children and old people.</p> <p>(3) Reduce the prevalence of communicable diseases by collaborating with relevant departments, schools for awareness creation and improved understanding of factors exacerbating communicable</p>	(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.	Entire Life cycle of project



			<p>diseases, including coping strategies that result in behaviour change.</p> <p>(4) Improve capacity of health services by:</p> <p>(4.1) collaborating with clinics to identify opportunities for assisting with health services, specifically in terms of resources and maintenance issues;</p> <p>(4.2) On-site health facility operational at the onset of construction;</p> <p>(4.3) Assisting with the development of health-effect prevention plan to increase community resilience by improving coping capability reducing exposure and reducing susceptibility of vulnerable sub-populations.</p>		
	<p><b>Population Influx – Social Pathologies</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop a grievance reporting procedure.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Implement HIV/AIDS and substance abuse awareness.</p> <p>(2) Make HIV/AIDS/STD prevention programmes a condition of contract for suppliers/sub-contractors.</p> <p>(3) Control access at site to prevent the presence of sex workers.</p> <p>(4) Establish clear rules and regulations for access to the mine site.</p> <p>(5) Work with local health service providers to provide services and health surveys also on substance abuse.</p> <p>(6) Establish liaison structures with local police and local community policing forums.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Reduce substance abuse and bad moral choices by conducting substance-abuse prevention education programmes.</p> <p>(2) Establish appropriate recreation facilities, taking special cognisance of workers without families.</p> <p>(3) Prevent transmission, reduce prevalence and mitigate the effects of STD's by developing an awareness and prevention campaign targeting the work force. Include requirements for case finding and treatment of curable STI's.</p> <p>(4) Develop a peer educator's programme that includes the distribution of condoms and provision of</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	<p>Entire Life cycle of project</p>



			<p>Voluntary Counselling and testing.</p> <p>(5) Increase awareness about lifestyle diseases by providing educational hand-outs for use in local clinics and schools.</p> <p>(6) Reduce the adverse impacts of non-communicable diseases in the workforce by providing programmes to support the psychosocial, emotional and mental health of the workforce. These programmes to include the screening for cancer, diabetes, and high blood pressure.</p> <p>(7) Develop an awareness programme on lifestyle behaviours including eating habits, exercise, and responsible social choices.</p>		
<b>Population Influx – Community Conflict</b>	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop and implement a social development plan.</p> <p>(3) Develop and implement a skills development program.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Promote an open and honest relationship with the local community.</p> <p>(2) Ensure the employment of local labour force and service providers or sub-contractors.</p> <p>(3) Promote community involvement through supporting local development projects.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Improve social cohesion in the community by collaborating with the authorities to establish a system to monitor violence and assess community cohesion related to project activities.</p> <p>(2) Conduct violence-prevention education programmes.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	Entire Life cycle of project
<b>Health and Safety of employees</b>	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Health and Safety plan.</p> <p>(2) All employees to be trained in health and safety in the work place.</p> <p>(3) Develop and implement a employee training program.</p> <p>(4) Keep and maintain a record of all training of employees.</p>	<p>(1) Develop and implement a Health and Safety Management plan.</p>	Entire Life cycle of project





			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Ensure compliance to the relevant Occupational Health and safety act and regulations.</p> <p>(2) All employees or sub-contractors entering site must be inducted to ensure the awareness of the developed health and safety plan.</p> <p>(3) A health and safety representatives to be appointed.</p> <p>(4) Regular inspections and observations of on-site activities shall take place.</p> <p>(5) All incidents to be reported, recorded, investigated, and mitigated.</p> <p>(6) Where required, adequate safety requirements for all areas to be clearly indicated.</p> <p>(7) Employees or sub-contractors must be informed as to what required PPE is applicable in working sections.</p> <p>(8) All site personnel and sub-contractors to be fully equipped with appropriate PPE at all times.</p> <p>(9) Safety signs to be provided in areas considered as high risk zones.</p> <p>(10) Adequate first aid services must be provided.</p> <p>(11) Ongoing health and safety awareness campaigns must be promoted.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Develop a Mine Health and Safety Management plan in accordance with the following legislation:</p> <ul style="list-style-type: none"> <li>• Occupational Health and Safety Act of 2004; and</li> <li>• Mine Health and safety Act of 1996.</li> </ul> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Increase awareness on safety by presenting Awareness training and education on safety risks potentially experienced by employees that are associated with overcrowding including, paraffin poisoning, fires, burns, road safety.</p> <p>(2) Involvement in awareness campaigns at schools about traffic safety, paraffin, pesticide and domestic fuel-use safety.</p> <p>(3) Reduce injuries on site by managing access control to site.</p> <p>(4) All personnel or visitors to be trained on safety issues before entering site.</p> <p>(5) Reduce occupational sources of injuries and accidents by providing training and regular refresher</p>		
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			<p>courses for employees on safety issues.</p> <p>(6) Adhere to the Occupational and Mine Health and safety acts.</p> <p>(7) Form a Safety and health forum to discuss success and failure. These forums meetings to be held on a regular basis.</p>		
<b>Job Creation and Skills Training</b>	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p> <p>(2) Develop a grievance reporting procedure.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Maximise and monitor local recruitment where required.</p> <p>(2) Consult local labour recruitment offices.</p> <p>(3) Prevent nepotism/corruption in local recruitment structures.</p> <p>(4) Promote employment of women and youth.</p> <p>(5) Train locally-recruited construction workers for longer-term employment where possible.</p> <p>(6) Develop a register of local SMMEs.</p> <p>(7) Linkages with skills Development/ SMME development institutions.</p> <p>(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR projects.</p> <p>(9) Support economic diversification through development of alternative markets.</p> <p>(10) Collaborate with adjacent mining companies to develop and implement sustainable community projects.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Improving financial skills in employees and extended families, and community by conducting socio-economic education programmes and teaching financial skills.</p>	<p>(1) Develop and implement a Social Labour plan as defined by the MRPDA.</p> <p>(2) Develop and implement a grievance lodging procedure.</p>	Entire Life cycle of project
<b>Job Creation (Multiplier affect) and</b>	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a social labour plan.</p>		Entire Life cycle of project



	Population Influx		<p>(2) Develop a grievance reporting procedure.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Maximise and monitor local recruitment where required.</p> <p>(2) Consult local labour recruitment offices.</p> <p>(3) Prevent nepotism/corruption in local recruitment structures.</p> <p>(4) Promote employment of women and youth.</p> <p>(5) Train locally-recruited construction workers for longer-term employment where possible.</p> <p>(6) Develop a register of local SMMEs.</p> <p>(7) Linkages with skills development/ SMME development institutions.</p> <p>(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR projects.</p> <p>(9) Support economic diversification through development of alternative markets.</p> <p>(10) Collaborate with adjacent mining companies to develop and implement sustainable community projects.</p>		
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>20. Drilling &amp; Blasting</p> <p>21. RoM &amp; product stockpiling</p> <p>22. Residue stockpiles</p> <p>23. Screening Operations</p> <p>24. Discard disposal</p>	Dust generation	Construction	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a dust fallout monitoring plan.</p> <p>(2) Frequent Inspections of areas prone to dust generation.</p> <p>(3) Report and record incidents related to air quality.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Construction activities to take place under the supervision of an environmental representative</p> <p>(2) Set the on-site speed limit to 40km/h for gravel roads and 50km/h for tar roads.</p> <p>(3) Develop and implement a dust suppression schedule.</p> <p>(4) Biodegradable and environmentally friendly flocculent (approved by the environmental control</p>	<p>(1) Develop and implement of a Dust management plan as part of a Air quality management plan to including the monitoring and prevention programme.</p> <p>(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014.</p> <p>(3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQA).</p> <p>(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(5) Ensuring compliance with the National</p>	Entire Life cycle of project



<p>(backfilling of mining area)</p> <p>30. Vehicular activity on haul roads; and operation of mining equipment</p> <p>31. Bulk transporting of Ore to market on Public roads</p>			<p>officer/environmental officer/ SHEQ officer) may be used as dust suppressant.</p> <p>(5) Adequately wet stockpile areas in anticipation of dry and/or windy conditions.</p> <p>(6) Cover loads with tarpaulin when transporting ROM, product, or any material in order to prevent dust generation.</p> <p>(7) Disturbed areas no longer used for mining related activities shall be re-vegetated immediately.</p> <p>(8) Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(2) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).</p> <p>(3) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013).</p> <p>(4) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies requirements regarding the control of emissions from diesel vehicles used on public roads. These requirements must form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Develop a detailed air quality management plan (focusing on sources of dust located in close proximity to the residential receptors within the project boundary) ensuring adherence to thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR) (<b>Appendix J</b>) prior to the commencement of operations.</p> <p>(2) Implement of recommended dust control methods as stipulated in Table 6-1 of the BAQIAR (<b>Appendix J</b>).</p> <p>(3) Dust generated from material handling operations and mining operations must be significantly reduced by wet suppression with the use of water sprays.</p> <p>(4) The combined use of water sprays with chemical surfactants provide more extensive wetting making it a more affective technique than water suppression alone.</p> <p>(5) The loading, transfer, and discharge of materials must take place with a minimum height of fall and be shielded against the wind.</p>	<p>Ambient Air Quality Standards (GNR 1210 of 24 December 2009)</p> <p>(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)</p>	
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			<p>(6) Controls to reduce emissions from unpaved roads must include vehicle restrictions which limit the speed, weight and number of vehicles on the road, surface improvements (paving or adding gravel to the road), and surface treatments (wet suppression or surface treatments).</p> <p>(7) All positive and negative effects of the different methods of dust suppression must be considered and the best feasible and successful option must be implemented.</p> <p>(8) Wind erosion from stockpiles and open areas must be minimised through the use of water sprays, wind breaks, vegetation and enclosures.</p> <p>(9) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road per given time</p> <p>(10) Hauling activities must be strictly restricted to designated hauling routes.</p> <p>(11) Regular maintenance of the vehicles/trucks (engines) must be undertaken to ensure optimal efficiency of the engine.</p> <p>(12) Regular maintenance of hauling routes and surface improvements (where necessary) must be undertaken.</p> <p>(13) Regular sweeping and cleaning of tarred/paved road surfaces to prevent the accumulation of dust</p> <p>(14) Immediate clean-up of any spillage of material on the hauling routes.</p> <p>(15) Regular inspections must be carried out on the vehicles/trucks (engines, tyres, etc.) and the route to ensure both are in good quality.</p> <p>(16) All material transported must be covered, where possible, and not left exposed during transportation.</p> <p>(17) Engines of the trucks must not be left running whilst not in use.</p> <p>(18) Clean fuels and fuel efficient vehicles/trucks/mobile equipment must be considered for use where possible.</p> <p>(19) Designated areas for the storage of overburden must be considered and incorporated into the design.</p> <p>(20) Monthly dust fallout monitoring as per the National Dust Control Regulations (2013) and reporting.</p> <p>(21) Monthly PM10 and PM2.5 ambient monitoring and reporting. This is also recommended to obtain baseline concentrations.</p> <p>(22) All main hauling roads must be treated for dust suppression to maintain at least 65% emission reduction efficiency.</p>		
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<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>22. Residue stockpiles</p>	<p>Alteration of the visual environment and topography</p>	<p>Construction</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Record keeping of the topography and environmental state before the commencement of any activities.</p> <p>(2) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Limit site clearance to approved areas.</p> <p>(2) Re-vegetate, with indigenous and non-invasive species, all cleared or rehabilitated areas immediately.</p> <p>(3) During rehabilitation ensure that the topography is reinstated as close as possible to the state before commencement of any activities.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) GN R. 1147 of NEMA requires the following documents as part of the authorisation process:</p> <p>(1.1) A annual rehabilitation plan;</p> <p>(1.2) A final rehabilitation, decommissioning and mine closure plan; and</p> <p>(1.3) An environmental risk assessment report.</p>	<p>(1) Mine plan in accordance with the MPRDA Regulation 56 section (1) to (8).</p> <p>(2) Adherence to the finalised approved lay out plan.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>	<p>Rehabilitation and Decommissioning</p>
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>20. Drilling &amp; Blasting</p> <p>21. RoM &amp; product stockpiling</p> <p>22. Residue stockpiles</p>	<p>Degradation of soil resources</p>	<p>Construction &amp; Operational</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a soil conservation and stockpile management plan.</p> <p>(2) Frequent Inspections of areas prone to degradation.</p> <p>(3) Report and record incidents related to degradation of soil resources.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>	<p>(1) Develop a soil conservation management plan.</p> <p>(2) Develop a storm water management plan.</p> <p>(3) Develop and implement of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p>	<p>Entire Life cycle of project</p>



<p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>25. Waste generation, storage and disposal</p> <p>26. Chemical Toilets</p> <p>29. Storage of fuel and lubricants in temporary facilities</p> <p>33. Rehabilitation of mining areas</p>			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area.</p> <p>(2) Do not mix sub-soil with topsoil and fertile soils.</p> <p>(3) Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material).</p> <p>(4) Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the stockpiles with indigenous, non-invasive vegetation.</p> <p>(5) Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood lines.</p> <p>(6) Implement storm water control measures on topsoil and fertile soil stockpiles.</p> <p>(7) Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from erosion.</p> <p>(8) Rehabilitation of areas after the completion of works to take place as soon as possible.</p> <p>(9) Avoid over exposing un-vegetated areas as far as possible.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.</p> <p>(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. These requirements must form part of the Soil Conservation and Stockpile management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Strip all usable soil, irrespective of soil depth.</p> <p>(2) Implement live placement of soil where possible, improve organic status of soils, maintain fertility levels and curb topsoil loss.</p> <p>(3) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion.</p> <p>(4) Loss of agricultural land due to establishment of infrastructure is a long term loss and no mitigation measures exist. Mitigation is restricted to limitation of extent of impact to the immediate area of impact and minimisation of off-site impacts.</p> <p>(5) Loss of agricultural land due to opencast mining is a temporary loss which must be mitigated by</p>		
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			<p>appropriate backfilling and re-placement of stockpiled topsoil. If done correctly, most of the original agricultural potential will be restored.</p> <p>(6) An Environmental Coordinator must manage environmental impacts in coordination with construction and operation schedule.</p> <p>(7) In the event that contractors are to be appointed these contractors to sign and undertake environmental compliance.</p> <p>(8) Keep disturbed areas and stockpiles to minimum to prevent soil loss.</p> <p>(9) Identify suitable areas to stockpile stripped soil.</p> <p>(10) Prevent surface runoff and seepage on site from contaminating stockpiled soils and stripped areas.</p> <p>(11) Minimise soil erosion through wind and water</p> <p>(12) Remediate and rehabilitate disturbed areas in accordance with development plan</p>		
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>22. Residue stockpiles</p> <p>33. Rehabilitation of mining areas</p>	<p><b>Vegetation and habitat loss</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(2) Develop and implement a plant species search and rescue management plan.</p> <p>(3) Regular inspection of sensitive areas.</p> <p>(4) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(5) Report and record incidents related to unnecessary clearance of vegetation.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p>(8) Record keeping of all removed/relocated species.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Avoid clearing areas outside the development footprint.</p> <p>(2) Avoid development in sensitive environments such as areas within pristine or valuable ecological significance.</p> <p>(3) Before the commencement of any vegetation clearance, a search and rescue operation must take</p>	<p>(1) Develop a plant species search and rescue management plan.</p> <p>(2) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(3) Develop and implement a soil conservation management plan.</p> <p>(4) Apply for permits to remove protected species (provincial and national).</p>	<p>Entire Life cycle of project</p>





			<p>place identifying possible protected species as well as indigenous species.</p> <p>(4) An area must be identified to re-instate protected and indigenous areas.</p> <p>(5) If feasible an onsite nursery must be established and maintained.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA describes the duty of care and remediation of environmental damage.</p> <p>(2) A number of the proposed activities fall within or within close proximity to the Sekhukhune Centre of Endemism. Working outside the authorised footprints would require additional authorisation in terms of NEMA and The National Environmental Management: Biodiversity Act (NEMBA) of 2002.</p> <p>(3) The removal or disturbance of listed protected species in terms of NEMBA, the Limpopo Environmental Management Act of 2003, and the National Forest Act of 1998 would require a permit.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b><i>Terrestrial Ecology –</i></b></p> <p>(1) Prior to any new area being impacted by the mine, that area and a suitable buffer will have to be delineated and activities have to be preceded by a very thorough walkthrough, conducted between January and April, followed by the necessary plant Search and Rescue operations where applicable.</p> <p>(2) <b><i>Themeda triandra – Diheteropogon amplexens Grasslands (High sensitivity rating – Avoid as far possible)</i></b></p> <p>(2.1) Development in Grasslands must be limited to the absolute minimum, aiming for minimal to no alteration of the habitat configuration.</p> <p>(2.2) If some of these habitats are impacted or will be altered by the proposed development, all development must be preceded by a thorough footprint investigation followed by a Search and Rescue operation for all plants of conservation concern.</p> <p>(2.3) Components of the proposed development that must under no circumstance be located in this vegetation would include:</p> <p>(2.3.1) Buildings and/or ablution facilities;</p> <p>(2.3.2) Any form of waste/soil/overburden disposal or stockpiling</p> <p>(2.3.3) Tailings dams or processing plants; and</p> <p>(2.3.4) Any form of storage of materials or machinery.</p> <p>(3) <b><i>Cyperus sexangularis – Flueggea virosa Riparian Vegetation (No Go Area – only suitable crossings permissible)</i></b></p> <p>(3.1) Development in this vegetation/habitat and at least 50 m beyond must be limited to crossings of</p>		
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			<p>access roads only, aiming for minimal to no alteration of the habitat configuration.</p> <p>(3.2) Mining/development in this vegetation/habitat is strongly discouraged.</p> <p>(3.3) Where upstream vegetation will be obliterated or severely denuded, adequate storm water and erosion control measures must be put in place to slow down and disperse runoff volumes and prevent the degradation of other channels and riparian vegetation.</p> <p>(3.4) Where road crossings are necessary, channels may under no circumstance be sealed with any impermeable material, as this will lead to a loss of runoff- and related retention/replenishment of soil moisture reserves, nutrients and seeds.</p> <p>(3.5) Culverts must be designed in a way that water will never be concentrated to a width narrower than the actual channel, causing accelerated erosion during heavy downpours.</p> <p>(3.6) Components of the proposed development that may under no circumstance be located in or within 100 m of any drainage would include:</p> <p>(3.6.1) Buildings and/or ablution facilities;</p> <p>(3.6.2) Any form of waste/soil/overburden disposal or stockpile;</p> <p>(3.6.3) Tailings dams or processing plants; and</p> <p>(3.6.4) Any form of storage of materials or machinery</p> <p><b>(4) <i>Acacia tortilis – Dichrostachys cinerea Dry Mixed Bushveld (Medium Low sensitivity)</i></b></p> <p>(4.1) It is recommended that if additional space is required in future for any additional infrastructure, this will be situated on the more disturbed sections of this vegetation.</p> <p>(4.2) Community members must be engaged to clear out as much wood as possible from areas to be developed to alleviate the wood-clearing of more valuable large trees in the area.</p> <p>(4.3) Runoff from any sealed or bare surface must be contained to prevent the erosion of the donga areas and drainage lines below these plains.</p> <p>(4.4) Mine management of the Spitsvale Mine has indicated that they will attempt, where possible, to create more grazing for the Dithamaga community by trying to clear some of the encroached bush to allow perennial grasses to become re-established. For this, it was strongly advised against removing all vegetation with a bulldozer. Rather, the following must be done to break the sealed upper surface and reduce sheet erosion:</p> <p>(4.4.1) With a Ripper only, rip sections of up to 5 m wide along the contour, alternating with ± 5 m of bushveld as it is;</p> <p>(4.4.2) Rips should be at least 500 mm deep, and invasive thorn bushes uprooted to that depth as well to ensure their resprouting capacity from the below-ground lignotuber is also eradicated;</p> <p>(4.4.3) If possible, hand-collected seeds from surrounding areas should be re-introduced to the rips;</p> <p>(4.4.4) Use the cleared thorn bushes to loosely brush-pack the area - with the branching side facing upslope</p> <p><b>(5) <i>Kirkia wilmsii – Terminalia prunioides variable Bushveld (Medium-High sensitivity – Avoid as far possible)</i></b></p> <p>(5.1) Mining/development in this vegetation/habitat must be limited to the absolute minimum, aiming for minimal alteration of the habitat configuration.</p>		
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			<p>(5.2) This is most important within 100 m of any mountain streams and drainages, to prevent the accelerated erosion of lower-lying plains and fluvial systems.</p> <p>(5.3) If some of these habitats are impacted or will be altered by the proposed development, newly created slopes must preferably be shallower than the original slopes, but never steeper to enable a gradual re-establishment of the woody and herbaceous layer.</p> <p>(5.4) After decommissioning, it will be important to facilitate the re-establishment of a diverse vegetation layer as soon as possible.</p> <p><b>(6) <i>Hippobromus pauciflorus</i> – <i>Rhoicissus tridentata</i> Rock Outcrops (High sensitivity – Treat as No Go Areas as far possible)</b></p> <p>(6.1) Same requirements as stipulated under (5).</p> <p><b>(7) <i>Combretum hereroense</i> – <i>Euclea sekhukhuniensis</i> low bushveld (No Go, only limited access roads permissible)</b></p> <p>(7.1) Mining/development in this vegetation/habitat is strongly discouraged, aiming for no alteration of the habitat.</p> <p>(7.2) Adjacent (upstream) areas also need to be cleared with care, ensuring that no excessive runoff is directed toward the donga plains.</p> <p>(7.3) Although current dongas may be relatively old and stable, new and accelerated erosion must be monitored and mitigated at all times.</p> <p>(7.4) After decommissioning, it will be important to facilitate the re-establishment of a dense herbaceous vegetation layer as soon as possible where these plains have been impacted.</p> <p>(8) Rehabilitate and re-vegetate all areas that have been disturbed as soon as practically possible.</p> <p>(9) Continually monitor the progress/success of rehabilitation efforts and adapt if rehabilitation targets are not met in acceptable timeframes</p> <p>(10) As part of decommissioning, all stockpiles must be entirely obliterated and landscaped to merge into the surroundings.</p> <p>(11) Keep main internal access route as planned along existing gravel roads.</p> <p>(12) After the final layout of mining operation components has been approved, conduct a thorough footprint investigation to determine any protected or red data plant species population location and size, and animal burrows:</p> <p>(12.1) Map (by GPS) as far as possible larger concentrations of large trees and protected species that could be avoided or must be relocated;</p> <p>(12.2) Protected trees, succulents and geophytes: must be relocated (trees as far as feasible);</p> <p>(12.3) Animal burrows: must be monitored by EO/ECO prior to ground clearing for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.</p> <p>(13) Strictly restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.</p> <p>(14) Animals accidentally injured by moving vehicles or machinery must be taken to a local</p>		
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			<p>veterinarian to be treated or put down in a humane manner.</p> <p>(15) Create designated turning areas and strictly prohibit any off-road driving or parking of vehicles and machinery outside designated areas.</p> <p>(16) Keep the clearing of natural veldt to a minimum.</p> <p>(19) It is desirable that community members be engaged to remove wood suitable for their purposes from areas to be cleared to alleviate the pressure of wood-harvesting currently on other areas of the land portions.</p> <p>(20) All remaining material of cleared shrubs and trees must be shredded and used as mulch.</p> <p>(21) Topsoil (the upper 25 cm of soil) is an important natural resource as it contains most of the geophytic storage organs as well as valuable soil seed resources necessary for re-vegetation; where it must (and then must) be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise handling of topsoil.</p> <p>(21) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive Management plan (Appendix E of the Biodiversity Impact Report (<b>Appendix L</b> to this report)).</p> <p><b>Avifauna –</b></p> <p>(1) Leave, as far as possible, as much of the natural indigenous bush undisturbed and in its pristine state.</p> <p>(2) Route connecting roads as close as is possible to already developed sites or roads.</p> <p>(3) Restrict or prohibit any off-road driving in areas of pristine indigenous bush.</p> <p>(4) Route power lines along these connecting roads, or if possible route them underground.</p> <p><b>Bat Survey –</b></p> <p>(1) Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely necessary.</p> <p>(2) Discourage vehicles from driving through the natural vegetation where mining activities are not taking place.</p> <p>(3) Prohibit mining plant and trucks from washing or dumping material near a water course (wet or dry) to prevent the pollution of natural water bodies.</p> <p>(4) Prohibit any chemical and/or heavy metal from being released into the environment.</p> <p>(5) Manage all waste water and stormwater to prevent pollution to water bodies.</p> <p><b><u>Recommendations as per comments received by the Department of Agriculture, Forestry, and Fisheries:</u></b></p> <p>(1) The <i>Lydenburgia cassinoides</i> (Sekhukhune bushman's tea) is confined to the Sekhukhune District</p>		
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				<p>Municipality only, therefore as part of the search and rescue management plan must promote the conservation of this specie.</p> <p>(2) When constructing new roads, divergence of roads is recommended where protected trees will be affected.</p> <p>(3) Relocation of protected trees must be adhered to, particularly all trees that are 1m and below. Relocation must be done under the supervision of a specialist to minimise the mortality rate.</p>		
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Destruction of Wetlands</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop and implement of a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) Create awareness of water conservation and protection of wetlands.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Plan the final site layout in a manner as to reduce the destruction of wetlands, if possible avoid working within a wetland. A wetland delineation will be required before the commencement of any activities within a wetland.</p> <p>(2) In the event that a wetland will be altered, mitigation measures to reduce the impact on the wetland must be strictly monitored.</p> <p>(3) Ensure water quality complies with the requirements stipulated by the Water Use Licence conditions.</p> <p>(4) Channels and drainage systems required to divert the flow of drainage lines to be designed by a civil engineer, taking into consideration the peak volumes and flow.</p> <p>(5) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to prevent the formation of erosion dongas or rills.</p>	<p>(1) Develop and implement a water management plan and specifically include the conservation measures to be implemented in wetland areas.</p> <p>(2) Ensure compliance with the issued WUL requirements.</p>	<p>Entire Life cycle of project</p>	



			<p>(6) Species of ecological importance to be searched and rescued and reinstated during rehabilitation.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.        (2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p>		
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				<p>(4) A storm water management plan (<b>Appendix G</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement of the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>20. Drilling &amp; Blasting</p> <p>21. RoM &amp; product stockpiling</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>27. River crossings</p> <p>29. Storage of fuel and lubricants in temporary facilities</p> <p>30. Vehicular activity on haul roads; and operation of mining equipment</p>	<p><b>Hydrocarbon Contamination</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Hazardous substances management plan addressing handling, storage, and transport of hazardous substances.</p> <p>(2) Develop and implement an emergency response procedure addressing the procedure in case of a chemical spill. This procedure must ensure the fastest possible reaction to spills or accidents as well as addressing remediation procedures.</p> <p>(3) Develop and implement of an incident reporting procedure.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Fuel to be stored in above ground storage tanks or sealed containers.</p> <p>(2) Hazardous substances to be stored within a bund area with a sump drainage.</p> <p>(3) Bunded areas to be designed to contain at least 110% of the storing capacity.</p> <p>(4) All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed environmental representative or the Department within 24 hours.</p> <p>(5) Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used.</p> <p>(6) On site spill kits or absorbent materials must be readily available. These kits must include materials to absorb, breakdown, and where possible encapsulate minor material spillages.</p> <p>(7) Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop areas. Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of any hydrocarbons.</p> <p>(8) All vehicles, plant, and equipment must be inspected on a daily basis. Records to be made available for these inspections.</p>	<p>(1) Develop a water management plan addressing monitoring and management requirements.</p> <p>(2) Develop a storm water management plan addressing the separation of "dirty" and clean "areas"</p> <p>(3) Develop an emergency response plan with specific reference to spill prevention and remediation.</p> <p>(4) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p> <p>(5) Develop and implement a Hazardous substances management plan.</p>	<p>Entire Life cycle of project</p>	



			<p>(9) Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment (where possible leaks may occur) when not in use.</p> <p>(10) All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil leakages.</p> <p>(11) Leaking equipment shall be removed and repaired immediately from site to facility designated for repairs.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 30 of the National Environmental Management Act (NEMA), Act 107 of 1998 describes measures to be taken to control emergency incidents. These requirements must be included in the developed Emergency Response procedure.</p> <p>(2) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of incidents involving Hazardous substances. These requirements must also be included in the Emergency response procedure.</p> <p>(3) GN R. 1237 published under the Mine Health and Safety Act of 1996 describes the requirements for the storage of hazardous substances. These requirements must be incorporated into the Hazardous substances management plan.</p> <p>(4) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition of Hazardous chemicals. These requirements must be considered as part of the mine acquisition process.</p> <p>(5) Regulation 277, 273, and 279 of GN R. 225 of the National Road traffic Act of 1996 describes the requirements of transporting hazardous waste. These requirements must be incorporated in both the Hazardous substances management plan and the Waste Management plan.</p> <p>(6) Regulation 277 and 273 of GN R. 225 of the National Road traffic Act of 1996 describes the Loading and offloading of dangerous goods. These requirements must be addressed in the Hazardous substances management plan.</p> <p>(7) All requirements described in the Hazardous substance Act of 1973 must be included in the Hazardous substances management plan.</p> <p>(8) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the National Environmental Management Act.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p>		
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			<p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p>		
<p>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19.Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>22. Residue stockpiles</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining</p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a water quality monitoring plan.</p> <p>(2) Develop and implement an incident reporting procedure.</p> <p>(3) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(4) Communicating findings of concern to I&amp;AP.</p> <p>(5) Develop and implement a storm water management plan.</p> <p>(6) Regular inspection an erosion prone areas for signs of erosion.</p> <p>(7) A soil conservation and stockpiling plan to be developed and implemented.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Avoid stockpiling material within drainage lines or in the 1:10 year flood line.</p>	<p>(1) Develop a storm water management plan.</p> <p>(2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.</p>	<p>Entire Life cycle of project</p>



<p>area)</p> <p><b>27. River crossings</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>32. Water Management</b></p> <p><b>33. Rehabilitation of mining areas</b></p>			<p>(2) Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas.</p> <p>(3) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.</p> <p>(4) Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas, workshops, lay down areas etc.</p> <p>(5) Water from excavations or mining areas either through seepage or collection to be pumped and discharge into a Sedimentation Ponds.</p> <p>(6) Before any water is permitted to enter natural drainage lines, the quality of water must comply with the standards contained in the Water Use Licence conditions.</p> <p>(7) River crossings shall be designed by a registered civil engineer.</p> <p>(8) Measures to avoid or prevent erosion formation must be incorporated into the designs of the infrastructure associated with the river crossings.</p> <p>(9) During construction through drainage lines, the majority of the flow must be allowed to pass down the stream. In stream diversions must be used rather than the construction of new channels.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p>		
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			<p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement of the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>27. River crossings</b></p> <p><b>28. Water supply (potable &amp; process)</b></p> <p><b>32. Water Management</b></p>	<p><b>Water level reduction and contamination</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to reinstatement of drainage lines.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop and implement a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(9) Create awareness of water conservation.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) River crossings or storm water channels shall be designed by a registered civil engineer.</p>	<p>(1) Develop and implement a water management plan and specifically include measures to be implemented to reduce the impact on surface and groundwater reduction.</p> <p>(2) Ensure compliance with the issued WUL requirements.</p> <p>(3) Develop and implement a storm water management plan and specifically address the diversion of "clean" water into the natural drainage lines.</p>	<p>Entire Life cycle of project</p>



			<p>(2) Measures to avoid or prevent erosion formation must be incorporated into the designs of the infrastructure associated with the river crossings.</p> <p>(3) During construction through drainage lines, the majority of the flow must be allowed to pass down the stream. In stream diversions must be used rather than the construction of new channels.</p> <p>(4) Filtered or treated water from Sedimentation Ponds may be used for dust suppression must they conform to the sediment load requirements or other quality requirements as specified by the Water Use Licence issued by the Department of Water Affairs and sanitation.</p> <p>(5) Monitor water usage and ensure that areas of waste are identified and minimised.</p> <p>(6) Where possible, reuse water from the Sedimentation Ponds for dust suppression on the roads.</p> <p>(7) in the event that RoM product materials requires the usage of water during processing, the holder of the environmental authorisation must ensure that these activities complies with the current authorisation and ensure that a WUL are obtained.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p>		
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			<p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement of the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>20. Drilling &amp; Blasting</p> <p>21. RoM &amp; product stockpiling</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p>	Noise generation	Construction & Operational	<p><b>Implement an EMS:</b></p> <p>(1) Develop and implement an Acoustical Measurement &amp; Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (<b>Appendix K</b>). (2) Recording, reporting, and remediating incidents related to noise.</p> <p>(3) Regular inspections of plant.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Limit the maximum speed on the haul roads to 60 km/h or less. Road speeds must be kept as consistent as is feasibly possible (i.e. no speed bumps to reduce noise or stop junctions). This will help minimise the use of air brakes as well as reduce required maximum capacity of heavy vehicles during pull off.</p> <p>(2) Roads must be planned so as to reduce heavy vehicles reversing when collecting or dumping at stockpiles/tips etc. (E.g. use of a loop instead of a dead-end road). This will minimise the use of</p>	<p>(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines.</p> <p>(2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.</p>	Before and during all phases on a quarterly basis.



<p>30. Vehicular activity on haul roads; and operation of mining equipment</p> <p>33. Rehabilitation of mining areas</p>			<p>reverse alarms on vehicles.</p> <p>(3) Regular inspections and servicing of plant.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) <i>Compliance with the National Noise control regulations.</i></p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Design an Acoustical Measurement &amp; Audit Programme. Note: If there are no noise-sensitive receptors within 1,000m from any mining activities no routine noise monitoring will be required.</p> <p>(2) If feasible the road must be paved or asphalted (e.g. continuous graded asphalt). From an acoustical perspective paver bricks must not be considered. It is likely that routes will be unpaved. The developer must consider maintain these unpaved routes regularly smoothing out irregularities on the routes.</p>		
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p>	<p>Destruction of graves</p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an awareness campaign on the protection of social heritage impacts.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) If human remains are uncovered during the course of authorised activities or archaeological work, the excavations affecting the burial must be stopped.</p> <p>(2) SAHRA must then be consulted and depending on the situation, the remains are either covered and left in situ, exposed (but not removed) and studied in situ, or fully excavated and studied with the consent and participation of the interested parties.</p> <p>(3) It is, therefore, advisable that if it is foreseen that any archaeological research will uncover human remains an agreement with the interested and affected parties and a permit for burials be obtained beforehand.</p> <p>(4) A suitable accredited archaeologist must be appointed on a watching brief to monitor the excavation of any grave sites.</p> <p>(5) At the onset of construction or mining operations, all graves that might be affected must be clearly demarcated and if possible fenced off to protect them from any accidental damage, whether they are earmarked for relocation, or not.</p> <p>(6) Should the decision be taken to propose the relocation of the affected graves, a suitably accredited and experienced service provider must be appointed to undertake relocation.</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>	<p>Entire Life cycle of project</p>



			<p>(7) Relocation of grave relocation is dependent on permission for the action by the close relatives and interested and affected parties from the community, and the requirement is that the developer must assist this community to fulfil their cultural and religious requirements during the process.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Obtain a permit or authorisation to disturb, deface, destroy, or remove protected features and sites in terms of Section 27 (18) of the National Heritage Resources Act (NHRA), No. 25 of 1999 from the South African Heritage Resources Agency (SAHRA).</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage Impact Assessment (HIA) report attached as <b>Appendix R</b>).</p> <p>(2) Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds must be made.</p> <p><b><u>Homestead sites –</u></b></p> <p>(3) A total of five old homestead sites were identified in the proposed mining area and it is anticipated that it would be impacted on by the mining activities.</p> <p>(4) It is recommended that the sites are retained, and that it must be fenced off with danger tape for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the stone walling/physical features.</p> <p>(5) If the sites cannot be retained, it must be documented (mapped and excavated) by an archaeologists after obtaining a permit from SAHRA.</p> <p>(6) If mining takes place in these areas, the community must be consulted to determine if there are any more graves in the region, especially those of young children who, in many cases, are buried inside the old homestead.</p> <p><b><u>Informal burial sites –</u></b></p> <p>(7) A total of nine informal burial sites were identified. All are located inside of or in close proximity to the mining area and it is anticipated that it would be impacted on by the mining activities.</p> <p>(8) If the burial places are retained, it must be fenced off with danger tape for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the graves.</p> <p>(9) If the graves cannot be retained, it must be relocated, but only on condition of following the correct procedures (see Appendix 3 of the HIA attached as <b>Appendix R</b>).</p>		
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<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Degradation of cultural significance heritage sites</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an awareness campaign on the protection of social heritage impacts.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) The position of known sites, as identified by the heritage impact assessment, must be clearly identified and marked and considered in the final site lay out.</p> <p>(2) Such areas shall be marked as no-go areas.</p> <p>(3) Artefacts may not be removed under any circumstances.</p> <p>(4) Do not disturb, deface, destroy or remove protected features and sites, whether fenced or not for the duration of the authorised activity, unless on the approval of the competent authority.</p> <p>(5) Permits shall be obtained from South African Heritage Resource Agency (SAHRA) must any authorised activities affect any world heritage sites or if any areas are to be destroyed or altered.</p> <p>(6) Works must be stopped immediately must any elements of cultural or heritage significance be found.</p> <p>(7) Do not resume works in the area in question without the required permits or authorisation from the competent authority.</p> <p>(8) A qualified and registered archaeologist must be appointed and consulted at such finding to appropriately excavate any artefacts in agreement with the Limpopo Heritage Resource Agency (LPHRA) and the SAHRA.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Obtain a permit or authorisation to disturb, deface, destroy, or remove protected features and sites from the South African Heritage Resource Agency (SAHRA) and Limpopo Heritage Resource Agency (LPHRA).</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage Impact Assessment (HIA) report attached as <b>Appendix R</b>).</p> <p>(2) Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds must be made.</p> <p><b><u>Homestead sites –</u></b></p> <p>(3) A total of five old homestead sites were identified in the proposed mining area and it is anticipated</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>	<p>Entire Life cycle of project</p>
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			<p>that it would be impacted on by the mining activities.</p> <p>(4) It is recommended that the sites are retained, and that it must be fenced off with danger tape for the duration of the mining, leaving a buffer zone of at least ten metres from the outer edge of the stone walling/physical features.</p> <p>(5) If the sites cannot be retained, it must be documented (mapped and excavated) by an archaeologists after obtaining a permit from SAHRA.</p> <p>(6) If mining takes place in these areas, the community must be consulted to determine if there are any more graves in the region, especially those of young children who, in many cases, are buried inside the old homestead.</p> <p><b>Industrial/Infrastructural heritage –</b></p> <p>(7) A single site defined as of industrial/infrastructural heritage was identified.</p> <p>(8) It is recommended that the irrigation system must be documented (photographed and mapped) in before mining activities takes place.</p>		
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>27. River crossings</p> <p>30. Vehicular activity on haul roads; and operation of mining equipment</p>	Erosion	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a storm water management plan.</p> <p>(2) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(3) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(4) Monthly monitoring of water quality (as per recommendation of specialist study).</p> <p>(5) Report and record incidents related to erosion.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Soil conservation measures to be implemented on stockpiles to prevent erosion. This could include the use of erosion control fabric or non-invasive grass seeding.</p> <p>(2) All areas susceptible to erosion must be identified and protection measures be implemented.</p> <p>(3) Retain natural trees, shrubbery and grass species where possible.</p> <p>(4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop a soil conservation management plan.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>	Entire Life cycle of project



<p><b>32. Water Management</b></p> <p><b>33. Rehabilitation of mining areas</b></p>			<p>be implemented, specifically when excavations or disturbances takes place within river banks, or the river bed.</p> <p>(5) Formation of erosion channels ("dongas") to be prevented by applying soil erosion control and bank stabilisation procedures as specified by a qualified environmental specialist.</p> <p>(6) Erosion formation beyond rills must be avoided.</p> <p>(7) Erosion damages to be repaired as soon as possible and no later than the target set by the Management team.</p> <p>(8) Slopes steeper than 1(V):4(H) or slopes where soils are by nature dispersive or erodible must be stabilised.</p> <p>(9) Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting on berms.</p> <p>(10) Access routes must not traverse slopes with gradients in excess of 8%.</p> <p>(11) Wherever possible, access routes must avoid crossing drainage lines and riparian zones.</p> <p>(12) Drainage lines must not be altered and must be level with the surrounding land once subsistence has occurred.</p> <p>(13) Run-off from roads must be managed in a way to avoid erosion and prevent pollution.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.</p> <p>(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. These requirements must form part of the Soil Conservation and Stockpile management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Hydrology –</b></p> <p>(1) A storm water management plan (<b>Appendix G</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(2) Implement of the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
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			<p><b>Soil –</b></p> <p>(1) Disturbance areas to be stripped progressively as required reducing erosion and sediment generation, to reduce the extent of topsoil and utilise stripped topsoil as soon as possible for rehabilitation.</p> <p>(2) The surface of the completed stockpile must be left in a rough condition to promote water infiltration and minimise erosion prior to vegetation establishment;</p> <p>(3) Topsoil stockpiles to have an embankment grade of approximately 1m vertical:4m horizontal (to limit the potential for erosion of the outer pile face);</p> <p>(4) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion.</p> <p>(5) Minimise soil erosion through wind and water</p> <p><b>Biodiversity – Also see Vegetation and Habitat loss</b></p> <p>(1) Limit the complete removal of vegetation.</p> <p>(2) Limit work outside the proposed footprint.</p> <p>(3) Reinforce portions of existing access routes that are prone to erosion or seasonal inundation, create structures or low banks to drain the access road rapidly during rainfall events, yet preventing erosion of the track and surrounding areas. Ensure that water flows are never concentrated in any way as soils are highly erodible.</p> <p>(4) Ensure that runoff from compacted or sealed surfaces is slowed down and dispersed sufficiently to prevent accelerated erosion from being initiated (erosion management plan required).</p>		
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>23. Screening</b></p>	CO <sub>2</sub> emissions	Construction & Operational	<p><b>Implement an EMS:</b></p> <p>(1) Develop and maintain a carbon footprint reporting policy.</p> <p>(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Plant and equipment to function at an optimal level.</p> <p>(2) Where possible lead replacement petrol to be used.</p> <p>(3) Where possible low sulphur containing diesel to be used.</p> <p>(4) All vehicles and equipment must be maintained and serviced according to the manufacturer's</p>	<p>(1) Develop and maintain a Carbon footprint reporting policy.</p> <p>(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.</p>	Entire Life cycle of project



<p><b>Operations</b></p> <p><b>28. Water supply (potable &amp; process)</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>31. Bulk transporting of Ore to market on Public roads</b></p>			<p>specification.</p> <p>(5) Any vehicle, plant or equipment emitting visible emissions from their exhaust systems must be serviced or repaired immediately.</p> <p><b>Legal requirements:</b></p> <p>(1) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies requirements regarding the control of emissions from diesel vehicles used on public roads. These requirements must form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.</p>		
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>27. River crossings</b></p> <p><b>32. Water Management</b></p>	<p><b>Alteration of drainage patterns</b></p>	<p>Construction &amp; Operational</p>	<p><b>Implement an EMS:</b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop and implement a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) A soil conservation and stockpiling plan to be developed and implemented.</p> <p><b>On-site mitigation measures:</b></p> <p>(1) Plan the final site layout in a manner as to reduce alteration of drainage patterns.</p> <p>(2) In the event that drainage patterns will be altered, the natural flow to be diverted.</p> <p>(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation and sedimentation.</p> <p>(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence conditions.</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>	<p>Entire Life cycle of project</p>



			<p>(5) Channels and drainage systems required to divert the flow of drainage lines to be designed by a civil engineer, taking into consideration the peak volumes and flow.</p> <p>(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to prevent the formation of erosion dongas or rills.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b><i>Geohydrology –</i></b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b><i>Hydrology –</i></b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with</p>		
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			<p>the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>32. Water Management</b></p>	<p><b>Destruction of upstream tributaries and reduction in water in the catchment</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a water monitoring management plan.</p> <p>(2) Record and report all incidents related to affecting water quality.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to reinstatement of drainage lines.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop and implement a storm water management plan.</p> <p>(7) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(8) A soil conservation and stockpiling plan to be developed and implemented.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Plan the final site layout in a manner as to reduce the destruction of upstream tributaries.</p> <p>(2) In the event that drainage patterns will be altered, the natural flow to be diverted as to prevent reduction of water in the catchment.</p> <p>(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation and sedimentation.</p> <p>(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence conditions.</p> <p>(5) Channels and drainage systems required to divert the flow of drainage lines to be designed by a</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>	<p>Entire Life cycle of project</p>



			<p>civil engineer, taking into consideration the peak volumes and flow.</p> <p>(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to prevent the formation of erosion dongas or rills.</p> <p><b>Legal requirements:</b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the appointed engineers.</p> <p><b>Specialist recommendations:</b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with</p>		
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			<p>the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>	
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>33. Rehabilitation of mining areas</b></p>	<p><b>Influx of alien invasive vegetation</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an alien and invasive control plan</p> <p>(2) Awareness training on the identification of weeds and alien species to employees responsible for the management of these species.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to prevent re-growth.</p> <p>(2) All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and weeds.</p> <p>(3) Chemical removal shall be used in accordance with the manufacturer's specification for weeds where mechanical eradication/control is no longer effective.</p> <p>(4) The type of chemical to be utilised must be determined in consultation with a herbicide consultant and the Environmental Control Officer/Environmental Officer/SHEQ Officer.</p> <p>(5) Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to be manually removed from site.</p> <p>(6) The herbicide consultant must have a Pest Control Operators licence.</p> <p>(7) Control the type of material imported to site to ensure that soil contamination, in terms of weed and alien invasive plants does not occur.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Compliance to requirements stipulated by GN R. 598 of NEMBA.</p>	<p>(1) Develop and implement an alien eradication and control management plan.</p> <p>Entire Life cycle of project</p>





			<p><b>(2) Section 3: Category 1b Listed Invasive Species (A total number of 6 species were identified – Appendix L):</b></p> <p>(2.1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.</p> <p>(2.2) A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.</p> <p>(2.3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(2.4) A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.</p> <p><b>(3) Section 4. Category 2 Listed Invasive Species (One specie has been identified – Agave sisalana):</b></p> <p>(3.1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.</p> <p>(3.2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.</p> <p>(3.3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.</p> <p>(3.4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(3.5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.</p> <p>(3.6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.</p>		
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			<p>(4) <b>Section 5. Category 3 Listed Invasive Species (One specie has been identified – <i>Morus alba</i>):</b></p> <p>(4.1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.</p> <p>(4.2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.</p> <p>(4.3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(5) When using herbicides and pesticides, requirements stipulated in section 7(2)(a)i) of the Fertilizers, farm feeds, agricultural remedies, and stock remedies Act of 1947 must be considered.</p> <p>(6) Requirements for the prohibition of spreading weeds stipulated in section 5 of the Conservation of Agricultural Resources Act (CARA) of 43 must be adhered with.</p> <p>(7) Regulation 15 of GN R.1048 published under CARA must be adhered with and considered as part of the alien invasive species management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Wheels of large machinery must be checked prior to entering the site and cleared of seed material of alien invasive plants if transport routes go through infested areas (especially of species with spiny or bur-like seeds). Such seed must be destroyed.</p> <p>(3) If filling material is to be used, this must be sourced from areas free of invasive species</p> <p>(4) Monitor the establishment of (alien) invasive species and remove as soon as detected, whenever possible before flowers or other regenerative material can be produced. Destruction of regenerative material by burning in a protected area is encouraged.</p> <p>(5) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive Management plan (Appendix E of the Biodiversity Impact Report (<b>Appendix L</b> to this report)).</p>		
<p>19. Opencast mining excavations</p> <p>20. Drilling &amp; Blasting</p> <p>21. RoM &amp; product</p>	<p>Contamination of water resources</p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a water monitoring program.</p> <p>(2) Develop and implement an Integrated Water and Waste Management Plan (IWWMP)</p>	<p>(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water monitoring schedule according to the water management plan.</p>	<p>Entire Life cycle of project</p>



<p><b>stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>25. Waste generation, storage and disposal</b></p> <p><b>26. Chemical Toilets</b></p> <p><b>27. River crossings</b></p> <p><b>28. Water supply (potable &amp; process)</b></p> <p><b>29. Storage of fuel and lubricants in temporary facilities</b></p> <p><b>32. Water Management</b></p>			<p>(3) Develop and implement a storm water management plan.</p> <p>(4) Regular inspections of all areas posing a risk of contaminating water resources.</p> <p>(5) Report and record all related incidents according to a developed procedure.</p> <p>(6) Develop and implement an emergency preparedness plan.</p> <p>(7) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(8) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) All sources of process water must be identified and quantified for the life cycle of the authorised activities.</p> <p>(2) A wastewater management system must be installed complying with regal requirements.</p> <p>(3) A water use licence for waste water storage facilities to be obtained.</p> <p>(4) All waste water management facilities to be designed by a qualified engineer.</p> <p>(5) Wash bays, service areas, and fuel storage areas may not be located within the 1:100 year flood line or horizontal distance of 100 m (whichever is greater) of a watercourse or drainage line.</p> <p>(6) No environmentally harmful detergents may be used.</p> <p>(7) Workshops, refuelling depots and washing areas shall be bunded.</p> <p>(8) All bunded areas to be constructed in a way as to avoid seepage to the surrounding environment as well as be able to contain its content to a capacity of 110% .</p> <p>(9) Water from wash bays, service areas and fuel storage areas must be discharged into oil separators and sumps.</p> <p>(10) Oils collected in this manner must be retained in a safe holding tank and removed from site by specialist oil recycling company or disposal at approved waste disposal sites.</p> <p>(11) No drainage from fuel storage areas to be permitted.</p> <p>(12) Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural environment.</p> <p>(13) Any contaminated storm water and other run-off from dirty areas to be disposed off in the suitably designed Sedimentation Ponds .</p>	<p>(3) Ensure compliance with the WUL conditions.</p> <p>(4) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.</p>	
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			<p>(14) Any spill which may contaminate water must be treated according to the approved spill management procedure.</p> <p>(15) Contain oil or fuel spills in water using an approved oil absorbent fibre.</p> <p>(16) Grey water not deemed suitable for dust suppression must be disposed of with other waste water in the designated and suitably designed PCD.</p> <p>(17) Waste water as well as spilled fuel collected within bunded areas and refuelling areas shall be disposed of or treated as hazardous waste.</p> <p>(18) Avoid unnecessary alteration of drainage lines.</p> <p>(19) Avoid locating lay down areas, wash bays, workshops etc. within the 1:50 year flood line or within horizontal distance of 100 m (whichever is greater) of a water course.</p> <p>(20) Contain contaminated runoff from dirty areas (i.e. lay down areas, RoM and product stockpile areas, workshops, fuelling bays etc.) in suitable designed Sedimentation Ponds .</p> <p>(21) Contaminated runoff to be treated and re-used for processing water or dust suppression in dirty areas only when complying with legal requirements or water quality standards specified in the Water Use Licence.</p> <p>(22) Do not locate any ablution facilities, chemical toilets, sanitary convenience, septic tanks, or French drains within the 1:100 year flood line, or within a horizontal distance of 100 m (whichever is greater) of any watercourses.</p> <p>(23) Do not allow the use of any drainage line or wetland for swimming, bathing, or cleaning of clothing, tools or equipment.</p> <p>(24) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.</p> <p>(25) Deflect any unpolluted water/runoff away from any dirty area.</p> <p>(26) Ensure that no storm water is allowed to enter any drainage installation for the reception, conveyance, storage, and or treatment of sewage.</p> <p>(27) Before any water is permitted to enter natural drainage lines, the quality of the water must comply with the standards contained within the Water Use Licensing conditions authorised by the DWAS.</p> <p>(28) Ensure water passing through vehicle wash bays and workshops pass through oil separators before passing into conservancy tank.</p> <p>(29) Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing</p>		
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			<p>siltation of streams and downstream dams.</p> <p><b>Legal requirements:</b></p> <p>(1) Obtain a Water Use Licence from the DWAS.</p> <p><b>Specialist recommendations:</b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>.);Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p>		
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				(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.		
20. Drilling & Blasting	Damage to surrounding landowner properties	Construction & Operational		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Drilling and Blasting procedure.</p> <p>(2) Develop and implement a drilling and blasting monitoring plan.</p> <p>(3) Pre and post inspections of possible affected properties.</p> <p>(4) Record keeping of all drilling and blasting activities, clearly indicating time and date of blast.</p> <p>(5) Report and record all related incidents according to a developed procedure.</p> <p>(6) Develop and implement an emergency preparedness plan.</p> <p>(7) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(8) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Ensure the mitigation measure stipulated by the drilling and blasting procedure are implemented.</p> <p>(2) Ensure the appointment of a suitably qualified blasting supervisor or officer.</p> <p>(3) Before any blasting activity commences a visual inspection of the blasting area or if within 5 metres from the high wall, an inspection of the high wall must be done.</p> <p>(4) Special attention must be paid to visible cracks, fallen ground, overhangs, loose material, boulders, fault lines, water seepage, and slip planes.</p> <p>(5) If the area is declared as safe by the Blasting supervisor/officer, then only may blasting activities proceed.</p> <p>(6) If a specific area is deemed as unsafe, the area must be demarcated and the production manager must be notified of the area.</p> <p>(7) Record must be kept of all the inspection reports.</p> <p>(8) The demarcated area must be made safe before any blasting activities will be allowed to commence.</p> <p>(9) In the event that attempts made to ensure the safety of demarcated areas, alternative measures</p>	(1) Develop and implement a Drilling and Blasting procedure.  (2) Develop and implement an emergency preparedness plan.	Entire Life cycle of project



			<p>needs to be implemented or blasting in that specific area must be avoided.</p> <p>(10) Only authorised personnel suitably qualified must be allowed to enter designated blasting zones.</p> <p>(11) These personnel must be equipped with appropriate PPE at all times.</p> <p>(12) The appointed personnel must spend the minimum amount of time to complete their work in danger zones.</p> <p>(13) While the work is continuing within the danger area, a periodical visual inspection must be done by the Blasting supervisor/officer to ensure the safety of any persons or infrastructure.</p> <p>(14) All machines or equipment working closer than 5 m from a high wall must be fitted with a Fall-on-Protection cab.</p> <p>(15) Drilling must be done perpendicular to the high wall with the mast between the cab and the high wall.</p> <p>(16) Drilling closer than 5m from the high wall will be a daylight operation only.</p> <p>(17) Only appointed and certified surface blasters will be allowed to blast on surface.</p> <p>(18) A siren (audible for at least a distance of 500m) must be sounded at least 5 minutes before each blast and must be sounded continually until the danger from blast has passed.</p> <p>(19) Each blast must take place during the hours of daylight and at a time when least disruption or interruption of the activities of other parties is likely to be caused.</p> <p>(20) The firing of explosives charges prepared for each blast will take place either by means of electronic methods, or when necessary an approved shot firing apparatus.</p> <p>(21) In each case where more than one shot hole is to be fired at any one time, the use of electronic methods of initiation for timing and minimal vibration and air blast purposes is used.</p> <p>(22) This aforementioned affords affective and safe blast designs with maximum efficiency in terms of fragmentation and confined peripheral impacts.</p> <p>(23) Charged patterns must be fired from a safe place where the shot firer has the clearest view of the area in the vicinity of the designated blasting site.</p> <p>(24) Consideration must be taken when blasting in overcast conditions or if visibility is poor as a result of mist, smoke, rain etc. or if high wind is blowing. Should such conditions continue past sunset, a "stand down" must be declared and the inspector of explosives must be contacted to request a "sleep over" of the blast.</p> <p>(25) All necessary precautions such as guarding and barricading off must then are implemented.</p>		
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			<p>(26) No secondary blasting may be carried out at any time that primary blasting operations are being conducted.</p> <p>(27) No blasting will take place under high-tension electrical cables or near to structures without the necessary risk assessments conducted and approvals granted.</p> <p>(28) Guards to be posted as specified to prevent any unauthorised entry into a blasting area.</p> <p>(29) The person in charge will ensure that there are no persons in the vicinity of the blasting area that could be endangered by the blast.</p> <p>(30) Only authorised persons allowed on the pattern, alternatively permission must be obtained from the blast supervisor/officer.</p> <p>(31) All relevant signs and contraband box to be in place at designated entrance to the pattern.</p> <p>(32) The destruction of any explosives must be done according to the specified procedure.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Compliance with the Health and Safety Act (Act 29 of 1996).</p> <p>(2) Compliance to the Mine and Explosives Act, Act no 15 of 2003.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Develop a drilling and blasting procedure that complies with the Health and Safety Act (Act 29 of 1996) and the explosives act, act no 15 of 2003.</p>		
<p>22. Residue stockpiles</p> <p>25. Waste generation, storage and disposal</p>	<p>Hazardous Leachate</p>	Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Design and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water quality management plan.</p> <p>(3) Regular inspections of the waste management areas and/or facilities.</p> <p>(4) Report and record all related incidents according to a developed procedure.</p> <p>(5) Develop and implement an emergency preparedness plan.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p>(8) Residue stockpile areas to be designed by a registered engineer according to the recommendations made in <b>Appendix V</b>.</p>	<p>(1) Develop and implement a Waste Management plan.</p> <p>(2) Develop and implement an Integrated Waste Water Management plan.</p>	Entire Life cycle of project





			<p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Ensure mitigation measures are implemented as to avoid the leachate of hazardous chemicals into the surrounding environment.</p> <p>(2) Implement a ground water monitoring plan and ensure the legal thresholds are not being exceeded.</p> <p>(3) Ensure remediation actions are taken immediately in the formation of hazardous leachates.</p> <p>(4) Ensure compliance with the issued Waste Management Licence.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA) of 2008 are incorporated in the Waste Management Plan.</p> <p>(2) GN R. 634 list a number of requirements related to Waste classification and management. These requirements as stipulated in the regulations must be incorporated into the Waste Management Plan.</p> <p>(3) GN R. 921 list a number activities that requires a Waste Management Licence in terms of NEMWA. Listed activity number 11 ("The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MPRDA (Act 28 of 2002)") will require a waste management licence in terms of the regulations.</p> <p>(4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the National Waste Information System.</p> <p>(5) GN R. 635 sets the National norms and standards for the assessment of waste for landfill. <b>Appendix V</b> classified the landfill engineering requirements as a Class D landfill. Therefore residue stockpile areas are required to be designed according to the recommendations made.</p> <p>(6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These requirements must be considered when disposing waste to landfill.</p> <p>(7) GN R. 926 stipulates the norms and standards associated to the storage of waste. These requirements must be incorporated in the Waste Management Plan.</p> <p>(8) All waste tyres generated on site must be managed according to the Waste tyre regulations published under the Environment Conservation Act of 1989.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b><u>Geohydrology –</u></b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and</p>		
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			<p>groundwater level changes up- and downstream of the proposed open cast mine workings. (2)          Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p>		
25. Waste generation, storage and disposal	Illegal dumping	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement as waste management plan with the focus on reuse, reduce, recycle, or avoid.</p> <p>(2) Develop and maintenance of a waste disposal record keeping system.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Characterise and quantify all waste streams associated to the authorised activities in terms of quantity, hazard, generation frequency and recyclability and define and implement disposal options as specified in the waste management plan.</p> <p>(2)As part of the characterisation define opportunities for source reduction, as well as reuse and recycling as opposed to simply disposing waste.</p> <p>(3) Ensure segregation of hazardous wastes from non-hazardous.</p> <p>(4) Sealable bins and containers must be made available for the storage of all streams of waste.</p> <p>(5) During the construction phase, temporary storage of construction waste to be stored in a bunded</p>	(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.	Entire Life cycle of project



			<p>designated area.</p> <p>(6) Waste will not be stored longer than specified by the waste regulations. If storage exceeds the threshold stipulated by the regulations a waste management licence must be obtained.</p> <p>(7) All waste materials must be removed off site by a suitable and registered waste service provider.</p> <p>(8) All waste to be disposed off at a suitably registered waste disposal facility.</p> <p>(9) Proof of disposal to be obtained and kept on record.</p> <p>(10) Maintain a waste register for materials removed from site, indicating type, quantity, date, haulage contractor, delivery point, and safe disposal certificates.</p> <p>(11) All waste receptacles to be clearly labelled according to type.</p> <p>(12) Where possible, recyclable waste including glass, paper, and plastic must be separated, stored and recycled where possible.</p> <p>(13) Waste oil and scrap metal must also be recycled if possible.</p> <p>(14) All employees or contractors must be informed about the necessity of using waste drums.</p> <p>(15) No littering will be allowed and a daily site clean-up will be initiated.</p> <p>(16) All domestic refuse generated by staff and sub-contractors must be disposed at a registered waste disposal facility by a suitably registered service provider on a regular basis (i.e. weekly).</p> <p>(17) Measures to ensure that solid waste is transported as to avoid waste spills en-route must be implemented.</p> <p>(18) Waste bins must be emptied on a regular basis as to ensure bins do not overflow.</p> <p>(19) Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof.</p> <p>(20) DO not dump waste of any nature, or any foreign material into any drainage line or stream. A strict no dumping policy must be communicated to all staff and sub-contractors.</p> <p>(21) During transportation of waste, all waste service providers must comply with the codes of practice and guidelines for licensing of waste transport vehicles and the regulation and monitoring of transport operations.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA)</p>		
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			<p>of 2008 are incorporated in the Waste Management Plan.</p> <p>(2) GN R. 634 list a number of requirements related to Waste classification and management. These requirements as stipulated in the regulations must be incorporated into the Waste Management Plan.</p> <p>(3) GN R. 921 list a number activities that requires a Waste Management Licence in terms of NEMWA. Listed activity number 11 ("The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MPRDA (Act 28 of 2002)") will require a waste management licence in terms of the regulations.</p> <p>(4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the National Waste Information System.</p> <p>(5) GN R. 635 sets the National norms and standards for the assessment of waste for landfill. The procedures for determining the class of waste for landfill must be incorporated into the Waste Management plan.</p> <p>(6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These requirements must be considered when disposing waste to landfill.</p> <p>(7) GN R. 926 stipulates the norms and standards associated to the storage of waste. These requirements must be incorporated in the Waste Management Plan.</p> <p>(8) All waste tyres generated on site must be managed according to the Waste tyre regulations published under the Environment Conservation Act of 1989.</p>		
26. Chemical Toilets	Smell nuisance	Construction & Operational	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP).</p> <p>(2) Frequent inspections of areas posing a possible risk of causing smell nuisance.</p> <p>(3) Develop and implement an incident response plan.</p> <p>(4) Report and record all related incidents according to a developed procedure.</p> <p>(5) Develop and implement an emergency preparedness plan.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Putrescible waste must be handled, stored, and disposed of before the probability of it generating</p>	<p>(1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets.</p> <p>(2) Develop and implement an Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste.</p> <p>(3) Develop and implement a Waste Management plan.</p>	Entire Life cycle of project



				<p>odours.</p> <p>(2) Chemical toilets must be emptied/ serviced on a regular basis. Proof of this must be obtained and kept on record.</p> <p>(3) Sewage tanks must be emptied on a regular basis. Proof of this must be obtained and kept on record.</p>		
<p>28. Water supply (potable &amp; process)</p> <p>32. Water Management</p>	<p>Improper water storage management</p>	<p>Construction &amp; Operational</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Water usage monitoring plan to be developed and implemented.</p> <p>(2) Create awareness of water conservation.</p> <p>(3) Regular inspections of water storage facilities.</p> <p>(4) Report and record of water management related incidents.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Filtered or treated water from Sedimentation Ponds may be used for dust suppression must they conform to the sediment load requirements or other quality requirements as specified by the Water Use Licence issued by the Department of Water Affairs and sanitation.</p> <p>(2) Monitor water usage and ensure that areas of waste are identified and minimised.</p> <p>(3) Where possible, reuse water from the Sedimentation Ponds for dust suppression on the roads.</p> <p>(4) Water may only be abstracted from the approved abstraction points once all grey water or run-off water complying with the quality requirements has been utilised for the purposes of dust suppression.</p> <p>(5) The volume of water abstracted may not exceed the limits stipulated by DWAS by more than 5% on an annual basis.</p> <p>(6) Water storage facilities to be inspected on a weekly basis to ensure no leaks or contamination of water source.</p> <p>(7) Water storage facilities and infrastructure to be maintained to a good working condition at all times.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p>	<p>(1) Develop and implement a water management plan specifically addressing the storage of water as well as the frequent inspections of storage facilities.</p>	<p>Entire Life cycle of project</p>



<p><b>29. Storage of fuel and lubricants in temporary facilities</b></p>	<p><b>Chemical Fires</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Hazardous substances management plan.</p> <p>(2) Develop an emergency procedure addressing in particular the management of chemical fires and spill response.</p> <p>(3) Report and record all incidents related to chemical fires.</p> <p>(4) Employees must be trained on emergency response procedures required to counter the nature and hazards of an accidental release.</p> <p>(5) Employees must be familiar with and have received the appropriate training regarding the handling and storage practices, for all containers with which they will come into contact.</p> <p>(6) Document the types and amounts of hazardous materials present on the project site (including for example the name and description, classification, regulatory reporting threshold, quantities, characteristics, analysis of potential consequence, identification of location, details of responsible persons, detail of availability of spill response equipment etc.).</p> <p>(7) The emergency response procedure must describe response activities in the event of a spill, release, or other chemical emergency and include the internal and external notification procedure, specific responsibilities of individuals or groups, decision process for assessing severity of the release, and determining appropriate actions, facility evacuation routes, and post event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response equipment.</p> <p>(8) Procedures must be prepared for informing the public and emergency response agencies, documenting first aid and emergency medical treatment, taking emergency response actions, reviewing and updating the emergency response plan to reflect changes, and using, inspecting, testing, and maintaining the emergency response equipment.</p> <p>(9) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(10) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Reactive, flammable, and explosive materials must be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion.</p> <p>(2) Ensure storage of incompatible materials (acids, basis, flammables, oxidisers, reactive chemical) in separate areas, and with containment facilities separating material storage areas.</p>	<p>(1) Develop and implement a fire prevention plan that includes measures of prevention and response to chemical fires.</p> <p>(2) Develop an emergency preparedness procedure and include the process to be followed in case of a chemical fire.</p> <p>(3) Develop a Hazardous substances management plan.</p> <p>(4) Develop a frequent inspection programme to include inspections of hazardous substances storage facilities.</p>	<p>Entire Life cycle of project</p>
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			<p>(3) Ensure the provision of material-specific storage for extremely hazardous or reactive materials.</p> <p>(4) Ensure the use of flame arresting devices on vents from flammable storage containers.</p> <p>(5) Ensure the provision of grounding and lightning protection.</p> <p>(6) Ensure the storage of hazardous materials in an area of the facility separated from the main authorised activities.</p> <p>(7) Ensure that all personnel that use or handle hazardous materials are trained in the use and potential dangers of the materials.</p> <p>(8) Implement all measures detailed in the spill prevention procedure in the event of a spill.</p> <p>(9) Prevent uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard.</p> <p>(10) Implement management controls (procedures, inspections, communicates, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures. (11) Store all hazardous (reactive, flammable, corrosive and toxic) materials in clearly identified, fit-for-purpose containers or vessels.</p> <p>(12) Chemical products must be secured when not needed to prevent tampering and vandalism.</p> <p>(13) Provide warning notices, fire fighting facilities and protection from weather damage.</p> <p>(14) Each shift supervisor or safety officer is to report on the integrity of the hazardous material storage.</p> <p>(15) Keep products in their original container (unless they are not re-sealable) with all stored products and containers being labelled, and original labels and MSDS retained.</p> <p>(16) Label containers so that the hazard nature of the material is clear.</p> <p>(17) Obtain Material Safety Data Sheets (MSDS) for all chemicals before use and all materials must be handled according to the instructions.</p> <p>(18) Transporters of hazardous materials must ensure that the vehicle is suitable and registered for the purpose it is being used.</p> <p>(19) Transport vehicles must display clear markings in English indicating the nature of the materials being carried, what to do in the event of an emergency, and an emergency telephone number (24 hour) of a responsible person who must provide advice in the event of an emergency.</p> <p>(20) No combustible material (e.g. wood, rags, carton boxes, etc.) are to be kept in the presence of</p>		
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			<p>flammable liquids.</p> <p>(21) "No Open Flames" and "No smoking" symbolic signs are to be displayed in the vicinity of the flammable liquid storage areas.</p> <p>(22) Flammable liquids are to be issued only on a need-to-use-basis and strict control is to be exercised to ensure that persons do not draw more than what is needed for the specific job.</p> <p>(23) All cables are to be grounded as appropriate.</p> <p>(24) An adequate number (according to safety regulations) and type of fire fighting equipment is to be available in the close vicinity of the flammable liquid store.</p> <p>(25) Flammable liquid stores are to be well ventilated and free of explosive vapours.</p> <p>(26) Flammable liquid containers in stores are to be clearly marked or labelled as to their contents.</p> <p>(27) Locations are to support MSDS information and handling/storage instructions.</p> <p>(28) Flammable liquid tanks are to be properly earthed in order to prevent static electricity accumulating.</p> <p>(29) Drainage points on flammable liquid tanks are to be provided with threaded caps or blanking plates.</p> <p>(30) Bund walls are to surround storage tanks containing flammable liquids and these must be able to contain the entire volume of the contents plus 10% in case of spillage.</p> <p>(31) Earthing is to be tested regularly (according to safety regulations).</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Bulk storage facilities of flammable liquids to be approved by the provincial fire inspector.</p> <p>(2) Section 30 of the National Environmental Management Act (NEMA), Act 107 of 1998 describes measures to be taken to control emergency incidents. These requirements must be included in the developed Emergency Response procedure.</p> <p>(3) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of incidents involving Hazardous substances. These requirements must also be included in the Emergency response procedure.</p> <p>(4) GN R. 1237 published under the Mine Health and Safety Act of 1996 describes the requirements for the storage of hazardous substances. These requirements must be incorporated into the Hazardous substances management plan.</p> <p>(5) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition</p>		
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			<p>of Hazardous chemicals. These requirements must be considered as part of the mine acquisition process.</p> <p>(6) Regulation 277, 273, and 279 of GN R. 225 of the National Road traffic Act of 1996 describes the requirements of transporting hazardous waste. These requirements must be incorporated in both the Hazardous substances management plan and the Waste Management plan.</p> <p>(7) Regulation 277 and 273 of GN R. 225 of the National Road traffic Act of 1996 describes the Loading and offloading of dangerous goods. These requirements must be addressed in the Hazardous substances management plan.</p> <p>(8) All requirements described in the Hazardous substance Act of 1973 must be included in the Hazardous substances management plan.</p> <p>(9) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the National Environmental Management Act.</p> <p>(10) Requirements stipulated in SANS 10089-1:2008 (above ground storage facilities for petroleum products) must be incorporated into the Hazardous Substance Management plan and be implemented on site.</p> <p>(11) Requirements stipulated by SANS 301: 2011 (Storage tank facilities for hazardous chemicals) must be incorporated into the Hazardous Substance Management plan and be implemented.</p>		
<p><b>31. Bulk transporting of Ore to market on Public roads</b></p>	<p><b>Pressure on public transport infrastructure</b></p>	<p>Construction &amp; Operational</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a traffic management plan.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Access roads must be planned so that only minimum linear distances are developed.</p> <p>(2) All storm water control mechanisms to be maintained.</p> <p>(3) Clean and repair any damages caused by the haul vehicles to public or private roads.</p> <p>(4) All incidents related to traffic resulting from the authorised activities must be documented and kept in the safety records.</p> <p>(5) Haulage of ROM product must preferably be scheduled off-peak hour traffic times.</p> <p>(6) Allow for safe pedestrian crossings where necessary.</p> <p>(7) Traffic calming measures must be implemented in consultation with the provincial traffic</p>	<p>(1) Develop and implement a traffic management plan.</p> <p>(2) Develop and implement a Public Complaints procedure.</p>	<p>Entire Life cycle of project</p>



			<p>department.</p> <p>(8) Traffic calming measures will be required at points indicated by the Traffic assessment report (Attached as <b>Appendix S</b>).</p> <p>(9) Warning signs must be placed on and around the site as per the Occupational, Health and Safety act requirements.</p> <p>(10) Clearly indicate which activities are to be taken place within which areas of the site using demarcation and/or signage.</p> <p>(11) All incidents must be reported to the appointed Health and Safety officer/Manager, investigated, documented, and kept in a safety file (digital or hardcopy).</p> <p>(12) Traffic warning signage must be erected where applicable, along transport routes and access roads.</p> <p>(13) All access roads shall be properly marked.</p> <p>(14) Markers shall show the direction of travel.</p> <p>(15) Roads not being used shall be marked with a "No Entry" sign.</p> <p>(16) Position security lighting so that it does not pose a nuisance to residential properties or tourist facilities or a danger to road users.</p> <p>(17) Warning barricading must be placed around open excavations and must be suitable for varying weather conditions.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Turning the R555 / D1261 intersection from a four way stop control to two way priority stop control, with priority on the R555 (refer to the drawings provided as Appendix A Figure 10 in the Traffic Impact Assessment report attached as <b>Appendix S</b>).</p> <p>(2) Providing for exclusive turning lanes on the D1261 / Access to the mine intersection.</p> <p>(3) Provision of lighting of sufficient standards at the intersection of the D2161 / Access Road to the BCR Chrome Mine.</p> <p>(4) Construction / paving (at least 400 m) of the existing access road to the proposed BCR Chrome Mine site east of the D1261 to prevent weathering on the edges of the D1261.</p> <p>(5) Provision of road signage and road markings.</p> <p>(6) No on-street pick up/drop offs at the D1261 Road / Access to mine intersection must be allowed</p>		
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				<p>(drop-offs / pickup must be done on site).</p> <p>(7) Parking provision must be done for trucks to prevent queuing on the national roads and the D1261.</p> <p><b>Human Health Aspects-</b></p> <p><i>The following measures must be taken to improve road safety:</i></p> <p>(1) Establish and maintain pictorial road-safety signage in local language and English language (if needed);</p> <p>(2) clearly demarcated pedestrian crossings in appropriate places;</p> <p>(3) descriptions along project roadways directly surrounding project facilities, including conveyor-belt routes if applicable, roadway rerouting areas, heavy equipment crossing areas, etc.</p> <p>(4) Regular vehicle maintenance;</p> <p>(5) adequately trained drivers; and</p> <p>(6) Adherence to speed limit, tracking of vehicles.</p>		
<b>Decommissioning</b>						
<p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>	<p><b>Hydrocarbon Contamination</b></p>	<p>Decommissioning</p>		<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a Hazardous substances management plan addressing handling, storage, and transport of hazardous substances.</p> <p>(2) Develop and implement an emergency response procedure addressing the procedure in case of a chemical spill. This procedure must ensure the fastest possible reaction to spills or accidents as well as addressing remediation procedures.</p> <p>(3) Develop and implement an incident reporting procedure.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Fuel to be stored in above ground storage tanks or sealed containers.</p> <p>(2) Hazardous substances to be stored within a bund area with a sump drainage.</p> <p>(3) Bunded areas to be designed to contain at least 110% of the storing capacity.</p>	<p>(1) Develop a water management plan addressing monitoring and management requirements.</p> <p>(2) Develop a storm water management plan addressing the separation of "dirty" and clean "areas"</p> <p>(3) Develop an emergency response plan with specific reference to spill prevention and remediation.</p> <p>(4) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p> <p>(5) Develop and implement a Hazardous substances management plan.</p>	<p>Entire Life cycle of project</p>



			<p>(4) All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed environmental representative or the Department within 24 hours.</p> <p>(5) Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used.</p> <p>(6) On site spill kits or absorbent materials must be readily available. These kits must include materials to absorb, breakdown, and where possible encapsulate minor material spillages.</p> <p>(7) Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop areas. Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of any hydrocarbons.</p> <p>(8) All vehicles, plant, and equipment must be inspected on a daily basis. Records to be made available for these inspections.</p> <p>(9) Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment (where possible leaks may occur) when not in use.</p> <p>(10) All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil leakages.</p> <p>(11) Leaking equipment shall be removed and repaired immediately from site to facility designated for repairs.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 30 of the National Environmental Management Act (NEMA), Act 107 of 1998 describes measures to be taken to control emergency incidents. These requirements must be included in the developed Emergency Response procedure.</p> <p>(2) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of incidents involving Hazardous substances. These requirements must also be included in the Emergency response procedure.</p> <p>(3) GN R. 1237 published under the Mine Health and Safety Act of 1996 describes the requirements for the storage of hazardous substances. These requirements must be incorporated into the Hazardous substances management plan.</p> <p>(4) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition of Hazardous chemicals. These requirements must be considered as part of the mine acquisition process.</p> <p>(5) Regulation 277, 273, and 279 of GN R. 225 of the National Road traffic Act of 1996 describes the requirements of transporting hazardous waste. These requirements must be incorporated in both the</p>		
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			<p>Hazardous substances management plan and the Waste Management plan.</p> <p>(6) Regulation 277 and 273 of GN R. 225 of the National Road traffic Act of 1996 describes the Loading and offloading of dangerous goods. These requirements must be addressed in the Hazardous substances management plan.</p> <p>(7) All requirements described in the Hazardous substance Act of 1973 must be included in the Hazardous substances management plan.</p> <p>(8) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the National Environmental Management Act.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p>		
35. Demolition / removal of portable and	Dust generation	Decommissioning	<p><b><u>Implement an EMS:</u></b></p>	(1) Develop and implement a Dust management plan as part of an Air quality management plan to including the monitoring and prevention	Entire Life cycle of project



<p><b>related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>				<p>(1) Develop a dust fallout monitoring plan.</p> <p>(2) Frequent Inspections of areas prone to dust generation.</p> <p>(3) Report and record incidents related to air quality.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Construction activities to take place under the supervision of an environmental representative</p> <p>(2) Set the on-site speed limit to 40km/h for gravel roads and 50km/h for tar roads.</p> <p>(3) Develop and implement a dust suppression schedule.</p> <p>(4) Biodegradable and environmentally friendly flocculent (approved by the environmental control officer/environmental officer/ SHEQ officer) may be used as dust suppressant.</p> <p>(5) Adequately wet stockpile areas in anticipation of dry and/or windy conditions.</p> <p>(6) Cover loads with tarpaulin when transporting ROM, product, or any material in order to prevent dust generation.</p> <p>(7) Disturbed areas no longer used for mining related activities shall be re-vegetated immediately.</p> <p>(8) Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and only stripped when work is about to take place.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(2) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).</p> <p>(3) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013).</p> <p>(4) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies requirements regarding the control of emissions from diesel vehicles used on public roads. These requirements must form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan..</p>	<p>programme.</p> <p>(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014.</p> <p>(3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQA).</p> <p>(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).</p> <p>(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)</p>	
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			<p><b><u>Specialist recommendations:</u></b></p> <p>(1) Develop a detailed air quality management plan (focusing on sources of dust located in close proximity to the residential receptors within the project boundary) ensuring adherence to thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR) (<b>Appendix J</b>) prior to the commencement of operations.</p> <p>(2) Implement recommended dust control methods as stipulated in Table 6-1 of the BAQIAR (<b>Appendix J</b>).</p> <p>(3) Dust generated from material handling operations and mining operations must be significantly reduced by wet suppression with the use of water sprays.</p> <p>(4) The combined use of water sprays with chemical surfactants provide more extensive wetting making it a more affective technique than water suppression alone.</p> <p>(5) The loading, transfer, and discharge of materials must take place with a minimum height of fall and be shielded against the wind.</p> <p>(6) Controls to reduce emissions from unpaved roads must include vehicle restrictions which limit the speed, weight and number of vehicles on the road, surface improvements (paving or adding gravel to the road), and surface treatments (wet suppression or surface treatments).</p> <p>(7) All positive and negative effects of the different methods of dust suppression must be considered and the best feasible and successful option must be implemented.</p> <p>(8) Wind erosion from stockpiles and open areas must be minimised through the use of water sprays, wind breaks, vegetation and enclosures.</p> <p>(9) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road per given time</p> <p>(10) Hauling activities must be strictly restricted to designated hauling routes.</p> <p>(11) Regular maintenance of the vehicles/trucks (engines) must be undertaken to ensure optimal efficiency of the engine.</p> <p>(12) Regular maintenance of hauling routes and surface improvements (where necessary) must be undertaken.</p> <p>(13) Regular sweeping and cleaning of tarred/paved road surfaces to prevent the accumulation of dust</p> <p>(14) Immediate clean-up of any spillage of material on the hauling routes.</p> <p>(15) Regular inspections must be carried out on the vehicles/trucks (engines, tyres, etc.) and the route</p>		
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				<p>to ensure both are in good quality.</p> <p>(16) All material transported must not be left exposed during transportation.</p> <p>(17) Engines of the trucks should not be left running whilst not in use.</p> <p>(18) Clean fuels and fuel efficient vehicles/trucks/mobile equipment must be considered for use.</p> <p>(19) Designated areas for the storage of overburden must be considered and incorporated into the design.</p> <p>(20) Monthly dust fallout monitoring as per the National Dust Control Regulations (2013) and reporting.</p> <p>(21) Monthly PM10 and PM2.5 ambient monitoring and reporting. This is also recommended to obtain baseline concentrations.</p> <p>(22) All main hauling roads must be treated for dust suppression to maintain at least 65% emission reduction efficiency.</p>		
<p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>	<p><b>Degradation of soil resources</b></p>	<p>Decommissioning</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a soil conservation and stockpile management plan.</p> <p>(2) Frequent Inspections of areas prone to degradation.</p> <p>(3) Report and record incidents related to degradation of soil resources.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p>(6) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area.</p> <p>(2) Do not mix sub-soil with topsoil and fertile soils.</p> <p>(3) Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material).</p> <p>(4) Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the stockpiles with indigenous, non-invasive vegetation.</p> <p>(5) Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood lines.</p>	<p>(1) Develop a soil conservation management plan.</p> <p>(2) Develop a storm water management plan.</p> <p>(3) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p>	<p>Entire Life cycle of project</p>	





			<p>(6) Implement storm water control measures on topsoil and fertile soil stockpiles.</p> <p>(7) Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from erosion.</p> <p>(8) Rehabilitation of areas after the completion of works to take place as soon as possible.</p> <p>(9) Avoid over exposing un-vegetated areas as far as possible.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.</p> <p>(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. These requirements must form part of the Soil Conservation and Stockpile management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Strip all usable soil, irrespective of soil depth.</p> <p>(2) Implement live placement of soil where possible, improve organic status of soils, maintain fertility levels and curb topsoil loss.</p> <p>(3) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion.</p> <p>(4) Loss of agricultural land due to establishment of infrastructure is a long term loss and no mitigation measures exist. Mitigation is restricted to limitation of extent of impact to the immediate area of impact and minimisation of off-site impacts.</p> <p>(5) Loss of agricultural land due to opencast mining is a temporary loss which must be mitigated by appropriate backfilling and re-placement of stockpiled topsoil. If done correctly, most of the original agricultural potential will be restored.</p> <p>(6) An Environmental Coordinator must manage environmental impacts in coordination with construction and operation schedule.</p> <p>(7) In the event that contractors are to be appointed these contractors to sign and undertake environmental compliance.</p> <p>(8) Keep disturbed areas and stockpiles to minimum to prevent soil loss.</p> <p>(9) Identify suitable areas to stockpile stripped soil.</p>		
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			<p>(10) Prevent surface runoff and seepage on site from contaminating stockpiled soils and stripped areas.</p> <p>(11) Minimise soil erosion through wind and water</p> <p>(12) Remediate and rehabilitate disturbed areas in accordance with development plan</p>		
<p>35. Demolition / removal of portable and related infrastructure</p> <p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p> <p>37. Rehabilitation of the lay down, stockpile and mining areas</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	Erosion	Decommissioning	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a storm water management plan.</p> <p>(2) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(3) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(4) Monthly monitoring of water quality (as per recommendation of specialist study).</p> <p>(5) Report and record incidents related to erosion.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Soil conservation measures to be implemented on stockpiles to prevent erosion. This could include the use of erosion control fabric or non-invasive grass seeding.</p> <p>(2) All areas susceptible to erosion must be identified and protection measures be implemented.</p> <p>(3) Retain natural trees, shrubbery and grass species where possible.</p> <p>(4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to be implemented, specifically when excavations or disturbances takes place within river banks, or the river bed.</p> <p>(5) Formation of erosion channels ("dongas") to be prevented by applying soil erosion control and bank stabilisation procedures as specified by a qualified environmental specialist.</p> <p>(6) Erosion formation beyond rills must be avoided.</p> <p>(7) Erosion damages to be repaired as soon as possible and no later than the target set by the Management team.</p> <p>(8) Slopes steeper than 1(V):4(H) or slopes where soils are by nature dispersive or erodible must be stabilised.</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop a soil conservation management plan.</p> <p>(3) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>	Entire Life cycle of project



			<p>(9) Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting on berms.</p> <p>(10) Access routes must not traverse slopes with gradients in excess of 8%.</p> <p>(11) Wherever possible, access routes must avoid crossing drainage lines and riparian zones.</p> <p>(12) Drainage lines must not be altered and must be level with the surrounding land once subsistence has occurred.</p> <p>(13) Run-off from roads must be managed in a way to avoid erosion and prevent pollution.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.</p> <p>(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. These requirements must form part of the Soil Conservation and Stockpile management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Hydrology –</b></p> <p>(1) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(2) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p> <p><b>Soil –</b></p> <p>(1) Disturbance areas to be stripped progressively as required to reduce erosion and sediment generation, to reduce the extent of topsoil and utilise stripped topsoil as soon as possible for rehabilitation.</p> <p>(2) The surface of the completed stockpile must be left in a rough condition to promote water infiltration and minimise erosion prior to vegetation establishment;</p> <p>(3) Topsoil stockpiles to have an embankment grade of approximately 1m vertical:4m horizontal (to limit the potential for erosion of the outer pile face);</p> <p>(4) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion.</p>		
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			<p>(5) Minimise soil erosion through wind and water</p> <p><b>Biodiversity – Also see Vegetation and Habitat loss</b></p> <p>(1) Limit the complete removal of vegetation.</p> <p>(2) Limit work outside the proposed footprint.</p> <p>(3) Reinforce portions of existing access routes that are prone to erosion or seasonal inundation, create structures or low banks to drain the access road rapidly during rainfall events, yet preventing erosion of the track and surrounding areas. Ensure that water flows are never concentrated in any way as soils are highly erodible.</p> <p>(4) Ensure that runoff from compacted or sealed surfaces is slowed down and dispersed sufficiently to prevent accelerated erosion from being initiated (erosion management plan required).</p>		
<p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>	<p><b>Noise generation</b></p>	<p>Decommissioning</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an Acoustical Measurement &amp; Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (<b>Appendix K</b>). (2) Recording, reporting, and remediating incidents related to noise.</p> <p>(3) Regular inspections of plant.</p> <p>(4) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(5) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Limit the maximum speed on the haul roads to 60 km/h or less. Road speeds must be kept as consistent as is feasibly possible (i.e. no speed bumps to reduce noise or stop junctions). This will help minimise the use of air brakes as well as reduce required maximum capacity of heavy vehicles during pull off.</p> <p>(2) Roads must be planned so as to reduce heavy vehicles reversing when collecting or dumping at stockpiles/tips etc. (E.g. use of a loop instead of a dead-end road). This will minimise the use of reverse alarms on vehicles.</p> <p>(3) Regular inspections and servicing of plant.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) <i>Compliance with the National Noise control regulations.</i></p>	<p>(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines.</p> <p>(2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.</p>	<p>Before and during all phases on a quarterly basis.</p>



			<p><b><u>Specialist recommendations:</u></b></p> <p>(1) Design an Acoustical Measurement &amp; Audit Programme. Note: If there are no noise-sensitive receptors within 1,000m from any mining activities no routine noise monitoring will be required.</p> <p>(2) If feasible the road must be paved or asphalted (e.g. continuous graded asphalt). From an acoustical perspective paver bricks must not be considered. It is likely that routes will be unpaved. The developer must consider maintain these unpaved routes regularly smoothing out irregularities on the routes.</p>		
<p>35. Demolition / removal of portable and related infrastructure</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	<p>General waste generation &amp; Littering</p>	Decommissioning	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a waste management plan with the focus on reuse, reduce, recycle, or avoid.</p> <p>(2) Develop and maintenance a waste disposal record keeping system.</p> <p>(3) Regular inspections of designated waste management area and/or facilities.</p> <p>(4) Report and record of waste related incidents.</p> <p>(5) Continuous awareness training on Recycling, Reduction, Re-use, and avoidance of waste.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Characterise and quantify all waste streams associated to the authorised activities in terms of quantity, hazard, generation frequency and recyclability and define and implement disposal options as specified in the waste management plan.</p> <p>(2) As part of the characterisation define opportunities for source reduction, as well as reuse and recycling as opposed to simply disposing waste.</p> <p>(3) Ensure segregation of hazardous wastes from non-hazardous.</p> <p>(4) Sealable bins and containers must be made available for the storage of all streams of waste.</p> <p>(5) During the construction phase, temporary storage of construction waste to be stored in a bunded designated area.</p> <p>(6) Waste will not be stored longer than specified by the waste regulations. If storage exceeds the threshold stipulated by the regulations a waste management licence must be obtained.</p> <p>(7) All waste materials must be removed off site by a suitable and registered waste service provider.</p> <p>(8) All waste to be disposed off at a suitably registered waste disposal facility.</p>	<p>(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.</p>	<p>Entire Life cycle of project</p>



			<p>(9) Proof of disposal to be obtained and kept on record.</p> <p>(10) Maintain a waste register for materials removed from site, indicating type, quantity, date, haulage contractor, delivery point, and safe disposal certificates.</p> <p>(11) All waste receptacles to be clearly labelled according to type.</p> <p>(12) Where possible, recyclable waste including glass, paper, and plastic must be separated, stored and recycled where possible.</p> <p>(13) Waste oil and scrap metal must also be recycled if possible.</p> <p>(14) All employees or contractors must be informed about the necessity of using waste drums.</p> <p>(15) No littering will be allowed and a daily site clean-up will be initiated.</p> <p>(16) All domestic refuse generated by staff and sub-contractors must be disposed at a registered waste disposal facility by a suitably registered service provider on a regular basis (i.e. weekly).</p> <p>(17) Measures to ensure that solid waste is transported as to avoid waste spills <i>enroute</i> must be implemented.</p> <p>(18) Waste bins must be emptied on a regular basis as to ensure bins do not overflow.</p> <p>(19) Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof.</p> <p>(20) DO not dump waste of any nature, or any foreign material into any drainage line or stream. A strict no dumping policy must be communicated to all staff and sub-contractors.</p> <p>(21) During transportation of waste, all waste service providers must comply with the codes of practice and guidelines for licensing of waste transport vehicles and the regulation and monitoring of transport operations.</p> <p><b>Legal requirements:</b></p> <p>(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA) of 2008 are incorporated in the Waste Management Plan.</p> <p>(2) GN R. 634 list a number of requirements related to Waste classification and management. These requirements as stipulated in the regulations must be incorporated into the Waste Management Plan.</p> <p>(3) GN R. 921 list a number activities that requires a Waste Management Licence in terms of NEMWA. Listed activity number 11 ("The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MPRDA (Act 28 of 2002)") will require a waste management licence in terms of the regulations.</p>		
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			<p>(4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the National Waste Information System.</p> <p>(5) GN R. 635 sets the National norms and standards for the assessment of waste for landfill. The procedures for determining the class of waste for landfill must be incorporated into the Waste Management plan.</p> <p>(6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These requirements must be considered when disposing waste to landfill.</p> <p>(7) GN R. 926 stipulates the norms and standards associated to the storage of waste. These requirements must be incorporated in the Waste Management Plan.</p> <p>(8) All waste tyres generated on site must be managed according to the Waste tyre regulations published under the Environment Conservation Act of 1989.</p>		
<p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p>	<p><b>CO<sub>2</sub> emissions</b></p>	<p>Decommissioning</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and maintain a carbon footprint reporting policy.</p> <p>(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Plant and equipment to function at an optimal level.</p> <p>(2) Where possible lead replacement petrol to be used.</p> <p>(3) Where possible low sulphur containing diesel to be used.</p> <p>(4) All vehicles and equipment must be maintained and serviced according to the manufacturer's specification.</p> <p>(5) Any vehicle, plant or equipment emitting visible emissions from their exhaust systems must be serviced or repaired immediately.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies requirements regarding the control of emissions from diesel vehicles used on public roads. These requirements must form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.</p>	<p>(1) Develop and maintain a Carbon footprint reporting policy.</p> <p>(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.</p>	<p>Entire Life cycle of project</p>



<p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p> <p>37. Rehabilitation of the lay down, stockpile and mining areas</p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p>Decommissioning</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a water quality monitoring plan.</p> <p>(2) Develop and implement an incident reporting procedure.</p> <p>(3) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(4) Communicating findings of concern to I&amp;AP.</p> <p>(5) Develop and implement a storm water management plan.</p> <p>(6) Regular inspection of erosion prone areas for signs of erosion.</p> <p>(7) A soil conservation and stockpiling plan to be developed and implemented.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Avoid stockpiling material within drainage lines or in the 1:10 year flood line.</p> <p>(2) Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas.</p> <p>(3) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.</p> <p>(4) Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas, workshops, lay down areas etc.</p> <p>(5) Water from excavations or mining areas either through seepage or collection to be pumped and discharge into a Sedimentation Ponds.</p> <p>(6) Before any water is permitted to enter natural drainage lines, the quality of water must comply with the standards contained in the Water Use Licence conditions.</p> <p>(7) River crossings shall be designed by a registered civil engineer.</p> <p>(8) Measures to avoid or prevent erosion formation must be incorporated into the designs of the infrastructure associated with the river crossings.</p> <p>(9) During construction through drainage lines, the majority of the flow must be allowed to pass down the stream. In stream diversions must be used rather than the construction of new channels.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or within close proximity to a watercourse as defined by the National Water Act, act no of 1996.</p> <p>(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the</p>	<p>(1) Develop a storm water management plan.</p> <p>(2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.</p>	<p>Entire Life cycle of project</p>
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			<p>appointed engineers.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, Cl, NO3, SO4, HCO3, NH4, PO4.);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p><b>Hydrology –</b></p> <p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
37. Rehabilitation of the lay down, stockpile and mining areas	Influx of alien invasive vegetation	Decommissioning	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement an alien and invasive control plan</p> <p>(2) Awareness training on the identification of weeds and alien species to employees responsible for</p>	(1) Develop and implement an alien eradication and control management plan.	Entire Life cycle of project



			<p>the management of these species.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to prevent re-growth.</p> <p>(2) All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and weeds.</p> <p>(3) Chemical removal shall be used in accordance with the manufacturer's specification for weeds where mechanical eradication/control is no longer affective.</p> <p>(4) The type of chemical to be utilised must be determined in consultation with a herbicide consultant and the Environmental Control Officer/Environmental Officer/SHEQ Officer.</p> <p>(5) Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to be manually removed from site.</p> <p>(6) The herbicide consultant must have a Pest Control Operators licence.</p> <p>(7) Control the type of material imported to site to ensure that soil contamination, in terms of weed and alien invasive plants does not occur.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Compliance to requirements stipulated by GN R. 598 of NEMBA.</p> <p>(2) <b>Section 3: Category 1b Listed Invasive Species (A total number of 6 species were identified – Appendix L):</b></p> <p>(2.1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.</p> <p>(2.2) A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act.</p> <p>(2.3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(2.4) A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act.</p> <p>(3) <b>Section 4. Category 2 Listed Invasive Species (One specie has been identified – Agave</b></p>		
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			<p><b>sisalana):</b></p> <p>(3.1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.</p> <p>(3.2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.</p> <p>(3.3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.</p> <p>(3.4) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(3.5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3.</p> <p>(3.6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.</p> <p><b>(4) Section 5. Category 3 Listed Invasive Species (One specie has been identified – Morus alba):</b></p> <p>(4.1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.</p> <p>(4.2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.</p> <p>(4.3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.</p> <p>(5) When using herbicides and pesticides, requirements stipulated in section 7(2)(a)i) of the Fertilizers, farm feeds, agricultural remedies, and stock remedies Act of 1947 must be considered.</p> <p>(6) Requirements for the prohibition of spreading weeds stipulated in section 5 of the Conservation of</p>		
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			<p>Agricultural Resources Act (CARA) of 43 must be adhered with.</p> <p>(7) Regulation 15 of GN R.1048 published under CARA must be adhered with and considered as part of the alien invasive species management plan.</p> <p><b><u>Specialist recommendations:</u></b></p> <p>(1) Wheels of large machinery must be checked prior to entering the site and cleared of seed material of alien invasive plants if transport routes go through infested areas (especially of species with spiny or bur-like seeds). Such seed must be destroyed.</p> <p>(3) If filling material is to be used, this must be sourced from areas free of invasive species</p> <p>(4) Monitor the establishment of (alien) invasive species and remove as soon as detected, whenever possible before flowers or other regenerative material must be produced. Destruction of regenerative material by burning in a protected area is encouraged.</p> <p>(5) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive Management plan (Appendix E of the Biodiversity Impact Report (<b>Appendix L</b> to this report)).</p>		
<p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p>	<p><b>Vegetation and habitat loss</b></p>	<p>Decommissioning</p>	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(2) Develop and implement a plant species search and rescue management plan.</p> <p>(3) Regular inspection of sensitive areas.</p> <p>(4) A soil conservation and stockpiling plan to be developed and implemented.</p> <p>(5) Report and record incidents related to unnecessary clearance of vegetation.</p> <p>(6) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(7) Communicating findings of concern to I&amp;AP.</p> <p>(8) Record keeping of all removed/relocated species.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) Avoid clearing areas outside the development footprint.</p> <p>(2) Avoid development in sensitive environments such as areas within pristine or valuable ecological significance.</p>	<p>(1) Develop a plant species search and rescue management plan.</p> <p>(2) Develop a Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(3) Develop and implement a soil conservation management plan.</p> <p>(4) Apply for permits to remove protected species (provincial and national).</p>	<p>Entire Life cycle of project</p>



			<p>(3) Before the commencement of any vegetation clearance, a search and rescue operation must take place identifying possible protected species as well as indigenous species.</p> <p>(4) An area must be identified to re-instate protected and indigenous areas.</p> <p>(5) If feasible an onsite nursery must be established and maintained.</p> <p><b><u>Legal requirements:</u></b></p> <p>(1) Section 28 of NEMA describes the duty of care and remediation of environmental damage.</p> <p>(2) A number of the proposed activities fall within or within close proximity to the Sekhukhune Centre of Endemism. Working outside the authorised footprints would require additional authorisation in terms of NEMA and The National Environmental Management: Biodiversity Act (NEMBA) of 2002.</p> <p>(3) The removal or disturbance of listed protected species in terms of NEMBA, the Limpopo Environmental Management Act of 2003, and the National Forest Act of 1998 would require a permit.</p> <p><b><u>Specialist recommendations:</u></b></p> <p><b><i>Terrestrial Ecology –</i></b></p> <p>(1) Prior to any new area being impacted by the mine, that area and a suitable buffer will have to be delineated and activities have to be preceded by a very thorough walkthrough, conducted between January and April, followed by the necessary plant Search and Rescue operations where applicable.</p> <p>(2) <b><i>Themeda triandra – Diheteropogon amplexens Grasslands (High sensitivity rating – Avoid as far possible)</i></b></p> <p>(2.1) Development in Grasslands must be limited to the absolute minimum, aiming for minimal to no alteration of the habitat configuration.</p> <p>(2.2) If some of these habitats are impacted or will be altered by the proposed development, all development must be preceded by a thorough footprint investigation followed by a Search and Rescue operation for all plants of conservation concern.</p> <p>(2.3) Components of the proposed development that must under no circumstance be located in this vegetation would include:</p> <p>(2.3.1) Buildings and/or ablution facilities;</p> <p>(2.3.2) Any form of waste/soil/overburden disposal or stockpiling</p> <p>(2.3.3) Tailings dams or processing plants; and</p> <p>(2.3.4) Any form of storage of materials or machinery.</p> <p>(3) <b><i>Cyperus sexangularis – Flueggea virosa Riparian Vegetation (No Go Area – only suitable crossings permissible)</i></b></p>		
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			<p>(3.1) Development in this vegetation/habitat and at least 50 m beyond must be limited to crossings of access roads only, aiming for minimal to no alteration of the habitat configuration.</p> <p>(3.2) Mining/Development in this vegetation/habitat is strongly discouraged.</p> <p>(3.3) Where upstream vegetation will be obliterated or severely denuded, adequate storm water and erosion control measures must be put in place to slow down and disperse runoff volumes and prevent the degradation of other channels and riparian vegetation.</p> <p>(3.4) Where road crossings are necessary, channels may under no circumstance be sealed with any impermeable material, as this will lead to a loss of runoff- and related retention/replenishment of soil moisture reserves, nutrients and seeds.</p> <p>(3.5) Culverts must be designed in a way that water will never be concentrated to a width narrower than the actual channel, causing accelerated erosion during heavy downpours.</p> <p>(3.6) Components of the proposed development that may under no circumstance be located in or within 100 m of any drainage would include:</p> <p>(3.6.1) Buildings and/or ablution facilities;</p> <p>(3.6.2) Any form of waste/soil/overburden disposal or stockpile;</p> <p>(3.6.3) Tailings dams or processing plants; and</p> <p>(3.6.4) Any form of storage of materials or machinery</p> <p><b>(4) <i>Acacia tortilis – Dichrostachys cinerea Dry Mixed Bushveld (Medium Low sensitivity)</i></b></p> <p>(4.1) It is recommended that if additional space is required in future for any additional infrastructure, this will be situated on the more disturbed sections of this vegetation.</p> <p>(4.2) Community members must be engaged to clear out as much wood as possible from areas to be developed to alleviate the wood-clearing of more valuable large trees in the area.</p> <p>(4.3) Runoff from any sealed or bare surface must be contained to prevent the erosion of the donga areas and drainage lines below these plains.</p> <p>(4.4) Mine management of the Spitsvale Mine has indicated that they will attempt, where possible, to create more grazing for the Dithamaga community by trying to clear some of the encroached bush to allow perennial grasses to become re-established. For this, it was strongly advised against removing all vegetation with a bulldozer. Rather, the following must be done to break the sealed upper surface and reduce sheet erosion:</p> <p>(4.4.1) With a Ripper only, rip sections of up to 5 m wide along the contour, alternating with ± 5 m of bushveld as it is;</p> <p>(4.4.2) Rips should be at least 500 mm deep, and invasive thorn bushes uprooted to that depth as well to ensure their resprouting capacity from the below-ground lignotuber is also eradicated;</p> <p>(4.4.3) If possible, hand-collected seeds from surrounding areas should be re-introduced to the rips;</p> <p>(4.4.4) Use the cleared thorn bushes to loosely brush-pack the area - with the branching side facing upslope</p> <p><b>(5) <i>Kirkia wilmsii – Terminalia prunioides variable Bushveld (Medium-High sensitivity – Avoid as far possible)</i></b></p> <p>(5.1) Mining/development in this vegetation/habitat must be limited to the absolute minimum, aiming</p>		
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			<p>for minimal alteration of the habitat configuration.</p> <p>(5.2) This is most important within 100 m of any mountain streams and drainages, to prevent the accelerated erosion of lower-lying plains and fluvial systems.</p> <p>(5.3) If some of these habitats are impacted or will be altered by the proposed development, newly created slopes must preferably be shallower than the original slopes, but never steeper to enable a gradual re-establishment of the woody and herbaceous layer.</p> <p>(5.4) After decommissioning, it will be important to facilitate the re-establishment of a diverse vegetation layer as soon as possible.</p> <p><b>(6) <i>Hippobromus pauciflorus</i> – <i>Rhoicissus tridentata</i> Rock Outcrops (High sensitivity – Treat as No Go Areas as far possible)</b></p> <p>(6.1) Same requirements as stipulated under (5).</p> <p><b>(7) <i>Combretum hereroense</i> – <i>Euclea sekhukhuniensis</i> low bushveld (No Go, only limited access roads permissible)</b></p> <p>(7.1) Mining/development in this vegetation/habitat is strongly discouraged, aiming for no alteration of the habitat.</p> <p>(7.2) Adjacent (upstream) areas also need to be cleared with care, ensuring that no excessive runoff is directed toward the donga plains.</p> <p>(7.3) Although current dongas may be relatively old and stable, new and accelerated erosion must be monitored and mitigated at all times.</p> <p>(7.4) After decommissioning, it will be important to facilitate the re-establishment of a dense herbaceous vegetation layer as soon as possible where these plains have been impacted.</p> <p>(8) Rehabilitate and re-vegetate all areas that have been disturbed as soon as practically possible.</p> <p>(9) Continually monitor the progress/success of rehabilitation efforts and adapt if rehabilitation targets are not met in acceptable timeframes</p> <p>(10) As part of decommissioning, all stockpiles must be entirely obliterated and landscaped to merge into the surroundings.</p> <p>(11) Keep main internal access route as planned along existing gravel roads.</p> <p>(12) After the final layout of mining operation components has been approved, conduct a thorough footprint investigation to determine any protected or red data plant species population location and size, and animal burrows:</p> <p>(12.1) Map (by GPS) as far as possible larger concentrations of large trees and protected species that could be avoided or must be relocated;</p> <p>(12.2) Protected trees, succulents and geophytes: must be relocated (trees as far as feasible);</p> <p>(12.3) Animal burrows: must be monitored by EO/ECO prior to ground clearing for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.</p> <p>(13) Strictly restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.</p>		
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			<p>(14) Animals accidentally injured by moving vehicles or machinery must be taken to a local veterinarian to be treated or put down in a humane manner.</p> <p>(15) Create designated turning areas and strictly prohibit any off-road driving or parking of vehicles and machinery outside designated areas.</p> <p>(16) Keep the clearing of natural veldt to a minimum.</p> <p>(19) It is desirable that community members be engaged to remove wood suitable for their purposes from areas to be cleared to alleviate the pressure of wood-harvesting currently on other areas of the land portions.</p> <p>(20) All remaining material of cleared shrubs and trees must be shredded and used as mulch.</p> <p>(21) Topsoil (the upper 25 cm of soil) is an important natural resource as it contains most of the geophytic storage organs as well as valuable soil seed resources necessary for re-vegetation; where it must (and then must) be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise handling of topsoil.</p> <p>(21) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive Management plan (Appendix E of the Biodiversity Impact Report (<b>Appendix L</b> to this report)).</p> <p><b>Avifauna –</b></p> <p>(1) Leave, as far as possible, as much of the natural indigenous bush undisturbed and in its pristine state.</p> <p>(2) Route connecting roads as close as is possible to already developed sites or roads.</p> <p>(3) Restrict or prohibit any off-road driving in areas of pristine indigenous bush.</p> <p>(4) Route power lines along these connecting roads, or if possible route them underground.</p> <p><b>Bat Survey –</b></p> <p>(1) Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely necessary.</p> <p>(2) Discourage vehicles from driving through the natural vegetation where mining activities are not taking place.</p> <p>(3) Prohibit mining plant and trucks from washing or dumping material near a water course (wet or dry) to prevent the pollution of natural water bodies.</p> <p>(4) Prohibit any chemical and/or heavy metal from being released into the environment.</p> <p>(5) Manage all waste water and stormwater to prevent pollution to water bodies.</p> <p><b><u>Recommendations as per comments received by the Department of Agriculture, Forestry, and Fisheries:</u></b></p>		
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			<p>(1) The <i>Lydenburgia cassinoides</i> (Sekhukhune bushman's tea) is confined to the Sekhukhune District Municipality only, therefore as part of the search and rescue management plan must promote the conservation of this specie.</p> <p>(2) When constructing new roads, divergence of roads is recommended where protected trees will be affected.</p> <p>(3) Relocation of protected trees must be adhered to, particularly all trees that are 1m and below. Relocation must be done under the supervision of a specialist to minimise the mortality rate.</p>		
<p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	<p>Contamination of water resources</p>	Decommissioning	<p><b><u>Implement an EMS:</u></b></p> <p>(1) Develop and implement a water monitoring program.</p> <p>(2) Develop and implement an Integrated Water and Waste Management Plan (IWWMP)</p> <p>(3) Develop and implement a storm water management plan.</p> <p>(4) Regular inspections of all areas posing a risk of contaminating water resources.</p> <p>(5) Report and record all related incidents according to a developed procedure.</p> <p>(6) Develop and implement an emergency preparedness plan.</p> <p>(7) Ensuring corrective and preventative actions are taken to address nonconformities.</p> <p>(8) Communicating findings of concern to I&amp;AP.</p> <p><b><u>On-site mitigation measures:</u></b></p> <p>(1) All sources of process water must be identified and quantified for the life cycle of the authorised activities.</p> <p>(2) A wastewater management system must be installed complying with legal requirements.</p> <p>(3) A water use licence for waste water storage facilities to be obtained.</p> <p>(4) All waste water management facilities to be designed by a qualified engineer.</p> <p>(5) Wash bays, service areas, and fuel storage areas may not be located within the 1:100 year flood line or horizontal distance of 100 m (whichever is greater) of a watercourse or drainage line.</p> <p>(6) No environmentally harmful detergents may be used.</p> <p>(7) Workshops, refuelling depots and washing areas shall be bunded.</p> <p>(8) All bunded areas to be constructed in a way as to avoid seepage to the surrounding environment</p>	<p>(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water monitoring schedule according to the water management plan.</p> <p>(3) Ensure compliance with the WUL conditions.</p> <p>(4) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.</p>	Entire Life cycle of project



			<p>as well as be able to contain its content to a capacity of 110%.</p> <p>(9) Water from wash bays, service areas and fuel storage areas must be discharged into oil separators and sumps.</p> <p>(10) Oils collected in this manner must be retained in a safe holding tank and removed from site by specialist oil recycling company or disposal at approved waste disposal sites.</p> <p>(11) No drainage from fuel storage areas to be permitted.</p> <p>(12) Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural environment.</p> <p>(13) Any contaminated storm water and other run-off from dirty areas to be disposed off in the suitably designed Sedimentation Ponds .</p> <p>(14) Any spill which may contaminate water must be treated according to the approved spill management procedure.</p> <p>(15) Contain oil or fuel spills in water using an approved oil absorbent fibre.</p> <p>(16) Grey water not deemed suitable for dust suppression must be disposed of with other waste water in the designated and suitably designed PCD.</p> <p>(17) Waste water as well as spilled fuel collected within bunded areas and refuelling areas shall be disposed of or treated as hazardous waste.</p> <p>(18) Avoid unnecessary alteration of drainage lines.</p> <p>(19) Avoid locating lay down areas, wash bays, workshops etc. within the 1:50 year flood line or within horizontal distance of 100 m (whichever is greater) of a water course.</p> <p>(20) Contain contaminated runoff from dirty areas (i.e. lay down areas, RoM and product stockpile areas, workshops, fuelling bays etc.) in suitable designed Sedimentation Ponds .</p> <p>(21) Contaminated runoff to be treated and re-used for processing water or dust suppression in dirty areas only when complying with legal requirements or water quality standards specified in the Water Use Licence.</p> <p>(22) Do not locate any ablution facilities, chemical toilets, sanitary convenience, septic tanks, or French drains within the 1:100 year flood line, or within a horizontal distance of 100 m (whichever is greater) of any watercourses.</p> <p>(23) Do not allow the use of any drainage line or wetland for swimming, bathing, or cleaning of clothing, tools or equipment.</p>		
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			<p>(24) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.</p> <p>(25) Deflect any unpolluted water/runoff away from any dirty area.</p> <p>(26) Ensure that no storm water is allowed to enter any drainage installation for the reception, conveyance, storage, and or treatment of sewage.</p> <p>(27) Before any water is permitted to enter natural drainage lines, the quality of the water must comply with the standards contained within the Water Use Licensing conditions authorised by the DWAS.</p> <p>(28) Ensure water passing through vehicle wash bays and workshops pass through oil separators before passing into conservancy tank.</p> <p>(29) Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing siltation of streams and downstream dams.</p> <p><b>Legal requirements:</b></p> <p>(1) Obtain a Water Use Licence from the DWAS.</p> <p><b>Specialist recommendations:</b></p> <p><b>Geohydrology –</b></p> <p>(1) Develop an environmental monitoring programme in order to monitor the groundwater quality and groundwater level changes up- and downstream of the proposed open cast mine workings. (2) Collected monitoring data (quarterly) may be used for future model updates (e.g. every second year).</p> <p>(3) A number of geosites (i.e. boreholes, springs and surface water drainages) and newly proposed boreholes were identified (refer to the Geohydrological report in <b>Appendix P</b>) to be included into a monthly/quarterly monitoring programme.</p> <p>(4) The parameters to be analysed must comprise the following: Physical-chemical parameters (pH, EC, TDS); Major anions (F, Cl, NO<sub>3</sub>, SO<sub>4</sub>, HCO<sub>3</sub>, NH<sub>4</sub>, PO<sub>4</sub>); Major cations (K, Na, Mg, Ca, NH<sub>4</sub>); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI)).</p> <p>(5) Emphasis must be placed on monitoring of groundwater levels prior mining and during the operation phase as well as to establish the origin of the elevated nitrate concentrations in the project area.</p> <p>(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water.</p> <p><b>Hydrology –</b></p>		
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			<p>(1) A number of monitoring sample points have been identified in the Hydrological report (<b>Appendix G</b>). Additional sampling points have been recommended and must be included in the final water monitoring plan.</p> <p>(2) As part of the monitoring program going forward, samples must be taken monthly for at least the first year of operation. This must be revised to quarterly monitoring if no concerns are highlighted with the approval of DWAS.</p> <p>(3) The monitoring must include the standard analysis of major cations/anions as well as ICP scan for metals.</p> <p>(4) A storm water management plan (<b>Appendix D</b>) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998.</p> <p>(5) Implement the guidance provided by the South African National Roads Agency Limited (SANRAL) drainage manual. This document provides guidance on maximum permissible velocities for grass covers to avoid erosion and must be consulted during the detailed design phase.</p>		
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**e) Impact Management Outcomes**

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ( )

This section defines the objectives and targets (Table 19) associated to the mitigation programme.

*Table 19: Impact management outcomes associated to the identified aspects*

ACTIVITY whether listed or not listed. (E.g. 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...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. ☐ Modify through alternative method. ☐ Control through noise control ☐ Control through management and monitoring ☐ Remedy through rehabilitation..	STANDARD TO BE ACHIEVED (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.	
					Objective	Target
<b>Construction Phase</b>						



<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>8. Sedimentation Ponds (pollution containment)</b></p>	<p><b>Dust generation</b></p>	Air Quality	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Control dust fallout throughout the life cycle of the mining activity.</p> <p>If exceeding dust fallout standard, within 3 months after submission of a dust fallout monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>	<p>(1) Dust fallout levels at active operational sites do not exceed the pre-determined baseline levels by more than 10%.</p> <p>(2) Zero number of complaints from site staff, surrounding landowners and communities.</p> <p>(3) Compliance with legal required dust fallout levels.</p> <p>(4) Compliance with 600 mg/m<sup>2</sup> /day averaged over 30 days in residential areas and 1200 mg/m<sup>2</sup> /day averaged over 30 days in non-residential areas (no more than two within a year for two sequential months per dust fallout monitoring site).</p>
		Human Health				
		Topography and Visual Environment				



<p>ponds) i.e.  <b>Construction and operation</b></p>						
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Hydrocarbon Contamination</b></p>	<p>Surface Water quality</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Adequate protection of soil and water resources.</p> <p>Active remediation in case of spill is ensured.</p>	<p>(1) No evidence of hydrocarbon and hazardous spills.</p> <p>(2) No release of contaminated water into the natural environment.</p> <p>(3) Immediate removal and remediation of all spills.</p> <p>(4) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p>
		<p>Groundwater quality</p>				



3. Weigh bridge						
6. Storm water runoff management features		Wetlands and Aquatic Ecology				
9. Stores, workshops & wash bays						
11. Fuel operating power generators						
13. Fuel storage						
15. Transport of construction material, mobile plant and equipment to the site		Soil quality				
16. Use of existing drilled /						





new boreholes						
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related</p>	Degradation of soil resources	Soil quality	Construction & Operational	Remedy	Adequate protection of soil resources and remediation if degradation cannot be avoided.	<p>(1) No evidence of erosion.</p> <p>(2) No mixing of topsoil or fertile soils with infertile soils.</p> <p>(3) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.</p>



<p>mining          infrastructure</p> <p>9. Stores,          workshops          &amp; wash bays</p> <p>10. Ablutions &amp;          change house          with sewage          treatment plant</p> <p>11. Fuel          operating power          generators</p> <p>13. Fuel storage</p>		<p>Flora micro-          ecosystems</p>				
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<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the</b></p>	<p><b>Erosion</b></p>	<p>Loss of fertile soil</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>To prevent any erosion and to provide adequate erosion control measures where required.</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.</p> <p>(2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than 10%.</p> <p>(3) Erosion control measures implemented in high risk areas.</p> <p>(4) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.</p>
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site						
1. Access and hauling along roads i.e. during the construction of roads	Vegetation and habitat loss	Macro and Micro organisms	Construction & Operational	Remedy	<p>Avoid unnecessary loss of vegetation and habitats.</p> <p>Rehabilitation of all affected habitats and mining related areas.</p>	<p>(1) Limiting site clearance to areas as per the approved site layout plan.</p> <p>(2) All sensitive or protected flora identified to be rescued and relocated.</p> <p>(3) No signs of prolonged exposure of un-vegetated areas by lack of implementing</p>



<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p>		Fauna and Flora				<p>rehabilitation measures.</p> <p>(4) No unauthorised activities outside of the proposed footprint.</p> <p>(5) Avoid activities in No-Go areas as identified in <b>Appendix L</b>.</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil</b></p>	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	Construction & Operational	<b>Control</b>	<p>Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation.</p>	<p>(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.</p> <p>(2) Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels.</p> <p>(3) No incidents related to the pollution of rivers</p>



<p>stripping for lay down area and all related mining infrastructure</p> <p>6. Storm water runoff management features</p> <p>15. Transport of construction material, mobile plant and equipment to the site</p>		<p>Surface Water</p>				<p>and streams.</p> <p>(4) No visible signs of erosion damages.</p>
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing</p>	<p>Noise generation</p>	<p>Surrounding noise quality</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Control potential noise pollution stemming from the construction of the project</p>	<p>(1) Ensure equivalent A-weighted noise levels below 55 dBA at potentially noise-sensitive receptors (daytime).</p> <p>(2) Ensure equivalent A-weighted noise levels below 45 dBA at potentially noise-sensitive receptors (night-time).</p>



<p><b>and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>9.Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p>						<p>(3) Define the noisy areas with a set boundary ensuring that equivalent A-weighted noise levels at this boundary does not exceed 61 dB LAeq,24hr. It should be noted that the area would have to be demarcated as a “controlled zone” in terms of the NCR;</p> <p>(4)Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 5 - 7 dBA;</p> <p>(5) Ensuring compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. The referencing of the International Finance Corporation (World Bank) guidelines for an acceptable sound level in a residential area was also considered.</p>
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<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p>	<p><b>Alteration of drainage patterns</b></p>	<p>Wetland and Aquatic Ecology</p>	<p>Construction &amp; Operational</p>	<p><b>Remedy</b></p>	<p>Remedy the possible effects of alteration to natural drainage lines.</p> <p>Compliance with water quality requirements as set by the Water Use Licence Conditions.</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.</p> <p>(2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than 10%.</p> <p>(3) Erosion control measures implemented in high risk areas.</p> <p>(4) No signs of degradation of diversion channels or drainage systems.</p>
		<p>Surface Water quality</p>				
<p><b>1. Access and hauling along roads i.e. during</b></p>	<p><b>Destruction of upstream tributaries and</b></p>	<p>Wetland and Aquatic Ecology</p>	<p>Construction &amp; Operational</p>	<p><b>Remedy</b></p>	<p>Remedy the possible effects of destruction of upstream tributaries and reduction in the</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.</p> <p>(2) Sedimentation loads of streams and rivers</p>
		<p>Downstream water users</p>				





<b>the construction of roads</b>	<b>reduction in water in the catchment</b>	Surface Water quality			water catchment.  Adherence with water quality requirements set by the Water Use Licence Conditions.	not to exceed the baseline levels by more than 10%.  (3) Erosion control measures implemented in high risk areas.  (4) No signs of degradation of diversion channels or drainage systems.
<b>1. Access and hauling along roads i.e. during the construction of roads</b>	<b>Water usage for dust suppression</b>	Wastage of water resource	Construction & Operational	<b>Control</b>	Storm water run-off from dirty areas is as far as possible recycled for reuse.	(1) Abstraction from natural watercourses is kept to a minimum and does not exceed the DWAS Water Use Licence provisions by more than 5% on an annual basis.
<b>1. Access and hauling along roads i.e. during the construction of roads</b>  <b>2. Site clearing and topsoil</b>	<b>Influx of alien invasive vegetation</b>	Fauna and Flora micro and macro ecosystems	Construction	<b>Control</b>	Prevent the spreading of alien plants/seeds on site and to the surrounding areas.  Eradication and removal of alien and invasive plants.	(1) No visible presence of alien vegetation on site.



<p>stripping for lay down area and all related mining infrastructure</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>						
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay</p>	<p>CO<sub>2</sub> emissions &amp; Release of noxious gasses</p>	<p>Air Quality</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>The levels of greenhouse gas and CO<sub>2</sub> emissions emanating from the use of plant and vehicles as well as the use of generators for power on site, is kept to a minimum.</p>	<p>(1) All vehicles, plant, and equipment to be serviced as per manufacturer's maintenance schedules.</p> <p>(2) Record keeping of service records of all vehicles, plant, and equipment.</p> <p>(3) No evidence of plant, equipment or vehicles in bad condition.</p>



<p><b>down area and all related mining infrastructure</b></p> <p><b>9.Stores, workshops &amp;wash bays</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p>						
<p><b>2. Site clearing and topsoil stripping for lay</b></p>	<p><b>Topography and visual alteration</b></p>	<p>Topography and Visual Environment</p>	<p>Construction</p>	<p><b>Remedy</b></p>	<p>Remedy alteration of the visual environment and topography as close as possible to the predetermined</p>	<p>(1) No areas left un-vegetated. (2) No signs of alien or invasive species on site.</p>



<p>down area and all related mining infrastructure</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>					<p>state.</p>	<p>(3) Control of visual effects.</p> <p>(4) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>
<p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>16. Use of existing drilled / new boreholes</p>	<p>Water level reduction and contamination</p>	<p>Groundwater quality</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Control the potential water level reduction and contamination related to authorised activities.</p>	<p>(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.</p> <p>(2) Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels.</p> <p>(3) No incidents related to the pollution of rivers and streams.</p> <p>(4) No visible signs of erosion damages.</p> <p>(5) No signs of blockages to the natural flow of</p>
<p>Downstream water users</p>	<p>Surface Water quality</p>					



						the associated river catchment.
<b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b>	<b>Destruction of graves</b>	Loss of heritage resources	Construction & Operational	<b>Avoid</b>	Identification of all possible sites of archaeological value and graves has been identified prior to the commencement of authorised work.	(1) All sites clearly demarcated as no-go areas. (2) Evidence of records must further discoveries be identified during construction. (3) Full compliance to all mitigation measures.
<b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b>	<b>Degradation of cultural significance heritage sites</b>	Loss of heritage resources	Construction & Operational	<b>Avoid</b>	Identification of all possible sites of archaeological value and graves has been identified prior to the commencement of authorised work.	(1) All sites clearly demarcated as no-go areas. (2) Evidence of records must further discoveries be identified during construction. (3) Full compliance to all mitigation measures.
<b>4. Onsite Clinic</b>	<b>Medical Waste generation</b>	Human Health	Construction & Operational	<b>Control</b>	Properly manage all medical waste resulting from first aid	(1) No incidents related to miss management of medical waste.



					incidents.	
<p>4. Onsite Clinic</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p> <p>12. Lighting</p>	<p><b>Electricity usage</b></p>	<p>CO<sub>2</sub> emissions</p>	<p>Operational</p>	<p><b>Control</b></p>	<p>Control and monitor the carbon footprint of the Spitsvale Mine.</p>	<p>(1) Annual reduction of the Carbon footprint.</p>
<p>4. Onsite Clinic</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>	<p><b>Domestic water usage</b></p>	<p>Wastage of water resource</p>	<p>Operational</p>	<p><b>Avoid</b></p>	<p>Avoid wastage of water resources.</p> <p>Maintain all infrastructure associated to the management of domestic water.</p>	<p>(1) Abstraction from natural watercourses is kept to a minimum and does not exceed the DWAS Water Use Licence provisions by more than 5% on an annual basis.</p> <p>(2) No visible signs of leaks or damage to water storage infrastructure.</p>



<p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p>	<p><b>General waste generation &amp; Littering</b></p>	<p>Visual Environment</p> <p>Soils quality due to leachates</p> <p>Surface Water quality due to leachates</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Promoting the reduction, re-use, or recycle of waste where prevention is not possible.</p> <p>Disposal of waste to local waste disposal sites is limited.</p>	<p>(1) No littering.</p> <p>(2) No unpleasant odours.</p> <p>(3) Marked and sealable bins observed.</p> <p>(4) Evidence of waste disposal certificates.</p>
<p><b>7. Water storage facilities</b></p>	<p><b>Improper water storage management</b></p>	<p>Wastage of water resource</p> <p>Water contamination</p>	<p><b>Operational</b></p>	<p><b>Avoid</b></p>	<p>Avoid the wastage of water resources.</p> <p>Full compliance to the water abstraction limits provided by DWAS.</p> <p>Ensure maintenance of infrastructure related to water usage and storage.</p>	<p>(1) Abstraction from natural watercourses is kept to a minimum and does not exceed the DWAS Water Use Licence provisions by more than 5% on an annual basis.</p> <p>(2) No visible signs of leaks or damage to water storage infrastructure.</p>



<p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p>	<p><b>Contamination of water resources</b></p>	<p>Wetlands and Aquatic Ecology</p>	<p><b>Operational</b></p>	<p><b>Avoid</b></p>	<p>Avoid the release of pollutants into the aquatic environment.</p> <p>Waste water is appropriately managed. Erosion is prevented.</p> <p>Suitable water management facilities and treatment works are developed and maintained.</p>	<p>(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.</p> <p>(2) No evidence of pollutants released into streams and rivers.</p> <p>(3) No formation of erosion gullies or rills.</p> <p>(4) No leaks or spills caused by inadequate waste water management facilities.</p> <p>(5) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p>				
<p>Surface Water quality</p>	<p>Groundwater quality</p>	<p><b>8. Sedimentation Ponds (pollution containment)</b></p>			<p><b>Smell nuisance</b></p>	<p>Human health and safety environment</p>	<p>Construction &amp; Operational</p>	<p><b>Avoid</b></p>	<p>Avoid the generation of unpleasant odours on site at all times.</p>	<p>(1) All toilets are serviced.</p> <p>(2) Sedimentation Ponds containing putrescible waste to be monitored and kept</p>





<p>ponds) i.e.  <b>Construction and operation</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p>						<p>free of odour.</p> <p>(3) All putrescible waste removed and disposed off in a suitable manner.</p>		
<p><b>9.Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p>	<p><b>Chemical Fires</b></p>	<p>Human health and safety environment</p>	<p>Loss of ecosystems</p>	<p>Damage to property</p>	<p>Construction &amp; Operational</p>	<p><b>Avoid</b></p>	<p>Avoid and prevent chemical fires.</p> <p>Hazardous spills are prevented and no incidents to human health occur.</p>	<p>(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.</p> <p>(2) Immediate removal and remediation of all spills.</p> <p>(3) All staff trained.</p> <p>(4) All hazardous substances are documented.</p> <p>(5) No incidents recorded involving chemical fires.</p> <p>(6) Reporting of all section 30 of NEMA and</p>



						section 20 of the National Water Act incidents.
<b>12. Lighting</b>	<b>Light pollution</b>	Disruption in ecosystem especially nocturnal fauna species	Construction & Operational	<b>Control</b>	Limit the possible contribution to light pollution as far as reasonably possible.	(1) No signs of usage of light during night times, if not essential for the safety of operation or humans.
<b>13. Fuel storage</b>	<b>Emission of noxious fumes</b>	Air Quality	Construction & Operational	<b>Avoid</b>	Avoid the release of emissions of noxious fumes from fuel storage facilities.	(1) No leaks from bulk fuel storage facilities.
		Human Health				(2) No incidents relating to damage to lungs and eyes of employees or sub-contractors.
<b>14. Employment of workers and procurement of construction materials.</b>	<b>Loss of farm labour</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting open public communicate in terms of required labour.	(1) No complaints from local landowners regarding loss of farm labour. (2) Peaceful negotiations regarding employment opportunities.
	<b>Population Influx – Pressure on Resources</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting the management of population influx associated to the mining operations in a sustainable manner.	(1) Provision of existing housing infrastructure.
	<b>Population</b>	Socio-economic	Construction & Operational	<b>Control</b>	Control convicting social	(1) Continuous awareness training on HIV/AIDS/STD in collaboration with local health



	<b>Influx – Social Pathologies</b>				pathologies.	service providers.
	<b>Population Influx – Community Conflict</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting peaceful negotiations with the surrounding communities and local business owners.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.
	<b>Health and Safety of employees</b>	Human health and safety environment	Construction & Operational	<b>Control</b>	Ensuring the health and safety of all personnel on site.	(1) Low incidents of injured on duty (IOD's) on site.  (2) Low incidents of reported pedestrian accidents  (3) Records kept of health and safety training conducted for all staff on site. (4) Visible evidence and use of PPE.  (5) Visible health and safety signs of high risk areas.
	<b>Job Creation and Skills Training</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promote job creation and skills development of local employment.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.



	<b>Job Creation (Multiplier affect) and Population Influx</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promote job creation and skills development of local employment.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.
<b>Operational Phase</b>						
<b>17. Employment of workers</b>	<b>Loss of farm labour</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting open public communicate in terms of required labour.	(1) No complaints from local landowners regarding loss of farm labour. (2) Peaceful negotiations regarding employment opportunities.
	<b>Population Influx – Pressure on Resources</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting the management of population influx associated to the mining operations in a sustainable manner.	(1) Provision of existing housing infrastructure.
	<b>Population Influx – Social Pathologies</b>	Socio-economic	Construction & Operational	<b>Control</b>	Control convicting social pathologies.	(1) Continuous awareness training on HIV/AIDS/STD in collaboration with local health service providers.



	<b>Population Influx – Community Conflict</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting peaceful negotiations with the surrounding communities and local business owners.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.
	<b>Health and Safety of employees</b>	Human health and safety environment	Construction & Operational	<b>Control</b>	Ensuring the health and safety of all personnel on site.	(1) Low incidents of injured on duty (IOD's) on site. (2) Low incidents of reported pedestrian accidents. (3) Records kept of health and safety training conducted for all staff on site. (4) Visible evidence and use of PPE. (5) Visible health and safety signs of high risk areas.
	<b>Job Creation and Skills Training</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promote job creation and skills development of local employment.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social



						development projects.
	<b>Job Creation (Multiplier affect) and Population Influx</b>	Socio-economic	Construction & Operational	<b>Control</b>	Promoting open public communicate in terms of required labour.	(1) No complaints from local landowners regarding loss of farm labour. (2) Peaceful negotiations regarding employment opportunities.
<b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b>	<b>Dust generation</b>	Air Quality	Construction	<b>Control</b>	Control dust fallout throughout the life cycle of the mining activity.	(1) Dust fallout levels at active operational sites do not exceed the pre-determined baseline levels by more than 10%.
<b>19.Opencast mining excavations</b>						(2) Zero number of complaints from site staff, surrounding landowners and communities.
<b>20.Drilling &amp; Blasting</b>		Human Health				(3) Compliance with legal required dust fallout levels.
<b>21. RoM &amp;</b>						(4) Compliance with 600



<p><b>product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>31. Bulk transporting of Ore to market on Public roads</b></p>		<p>Topography and Visual Environment</p>				<p>mg/m<sup>2</sup> /day averaged over 30 days in residential areas and 1200 mg/m<sup>2</sup> /day averaged over 30 days in non-residential areas.</p> <p>(5) No more than two within a year, no two sequential months per dust fallout monitoring site.</p> <p>(6) If exceeding dust fallout standard, within 3 months after submission of a dust fallout monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>
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<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p>	<p><b>Alteration of the visual environment and topography</b></p>	<p>Topography and Visual Environment</p>	<p>Construction</p>	<p><b>Remedy</b></p>	<p>Remedy alteration of the visual environment and topography as close as possible to the predetermined state.</p>	<p>(1) No areas left un-vegetated.</p> <p>(2) No signs of alien or invasive species on site.</p> <p>(3) Control of visual effects.</p> <p>(4) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>
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<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19.Opencast mining excavations</b></p>	<p><b>Degradation of soil resources</b></p>	<p>Soil quality</p>	<p>Construction &amp; Operational</p>	<p><b>Remedy</b></p>	<p>Adequate protection of soil resources and remediation if degradation cannot be avoided.</p>	<p>(1) No evidence of erosion.</p> <p>(2) No mixing of topsoil or fertile soils with infertile soils.</p> <p>(3) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.</p>
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20. Drilling & Blasting						
21. RoM & product stockpiling						
22. Residue stockpiles						
23. Screening Operations						
24. Discard disposal (backfilling of mining area)		Flora micro-ecosystems				
25. Waste generation, storage and disposal						
26. Chemical Toilets						
29. Storage of						



<p><b>fuel and lubricants in temporary facilities</b></p> <p><b>33. Rehabilitation of mining areas</b></p>						
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<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>33. Rehabilitation of mining areas</b></p>	<p><b>Vegetation and habitat loss</b></p>	<p>Macro and Micro organisms</p>	<p>Construction &amp; Operational</p>	<p><b>Remedy</b></p>	<p>Avoid unnecessary loss of vegetation and habitats.</p> <p>Rehabilitation of all affected habitats and mining related areas.</p>	<p>(1) Limiting site clearance to areas as per the approved site layout plan.</p> <p>(2) All sensitive or protected flora identified to be rescued and relocated.</p> <p>(3) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.</p> <p>(4) No unauthorised activities outside of the proposed footprint.</p> <p>(5) Avoid activities in No-Go areas as identified in <b>Appendix L.</b></p>
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<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Destruction of Wetlands</b></p>	<p>Wetlands and Aquatic Ecology</p>	<p>Construction &amp; Operational</p>	<p><b>Avoid</b></p>	<p>Avoid the destruction of wetlands.</p>	<p>(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.</p> <p>(2)Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels.</p> <p>(3) No incidents related to the pollution of rivers and streams.</p> <p>(4) No visible signs of erosion damages.</p>
<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Hydrocarbon Contamination</b></p>	<p>Surface Water quality</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Adequate protection of soil and water resources. Active remediation in case of spill is ensured.</p>	<p>(1) No evidence of hydrocarbon and hazardous spills.</p> <p>(2) No release of contaminated water into the</p>



<p><b>19. Opencast mining excavations</b></p>		<p>Groundwater quality</p>				<p>natural environment.</p>
<p><b>20. Drilling &amp; Blasting</b></p>						<p>(3) Immediate removal and remediation of all spills.</p>
<p><b>21. RoM &amp; product stockpiling</b></p>		<p>Wetlands and Aquatic Ecology</p>				<p>(4) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p>
<p><b>23. Screening Operations</b></p>						
<p><b>24. Discard disposal (backfilling of mining area)</b></p>						
<p><b>27. River crossings</b></p>		<p>Soil Quality</p>				
<p><b>29. Storage of fuel and lubricants in temporary</b></p>						



<p><b>facilities</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p>						
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p>Wetland and Aquatic Ecology</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation.</p>	<p>(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.</p> <p>(2) Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels.</p> <p>(3) No incidents related to the pollution of rivers and streams.</p> <p>(4) No visible signs of</p>



22. Residue stockpiles						erosion damages.
23. Screening Operations						
24. Discard disposal (backfilling of mining area)						
27. River crossings		Surface Water quality				
30. Vehicular activity on haul roads; and operation of mining equipment						
32. Water Management						
33. Rehabilitation of						





mining areas						
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>27. River crossings</p> <p>28. Water supply (potable &amp; process)</p> <p>32. Water</p>	Water level reduction and contamination	Groundwater quality	Construction & Operational	Control	Control the potential water level reduction and contamination related to authorised activities.	<p>(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.</p> <p>(2) Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels.</p> <p>(3) No incidents related to the pollution of rivers and streams.</p> <p>(4) No visible signs of</p>
Downstream water users	Surface Water quality					



<b>Management</b>						<p>erosion damages.</p> <p>(5) No signs of blockages to the natural flow of the associated river catchment.</p> <p>(6) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p>
<p>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19.Opencast mining excavations</p> <p>20.Drilling &amp; Blasting</p> <p>21. RoM &amp; product</p>	<b>Noise generation</b>	Surrounding noise quality	Construction & Operational	<b>Control</b>	Control potential noise pollution stemming from the operational of the project	<p>(1) Ensure equivalent A-weighted noise levels below 55 dBA at potentially noise-sensitive receptors (daytime).</p> <p>(2) Ensure equivalent A-weighted noise levels below 45 dBA at potentially noise-sensitive receptors (night-time).</p> <p>(3) Define the noisy areas with a set boundary ensuring that equivalent A-weighted noise levels at this boundary</p>



<p>stockpiling</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>30. Vehicular activity on haul roads; and operation of mining equipment</p> <p>33. Rehabilitation of mining areas</p>						<p>does not exceed 61 dB LAeq,24hr. It should be noted that the area would have to be demarcated as a “controlled zone” in terms of the NCR;</p> <p>(4) Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 5 - 7 dBA;</p> <p>(5) Ensuring compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. The referencing of the International Finance Corporation (World Bank) guidelines for an acceptable sound level in a residential area was also considered.</p>
<p>18.Topsoil and</p>	<p>Destruction of</p>	<p>Loss of heritage resources</p>	<p>Construction &amp; Operational</p>	<p><b>Avoid</b></p>	<p>Identification of all possible sites of</p>	<p>(1) All sites clearly</p>



<p><b>subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>graves</b></p>				<p>archaeological value and graves has been identified prior to the commencement of authorised work.</p>	<p>demarcated as no-go areas.           (2) Evidence of records must further discoveries be identified during construction.           (3) Full compliance to all mitigation measures.</p>
<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Degradation of cultural significance heritage sites</b></p>	<p>Loss of heritage resources</p>	<p>Construction &amp; Operational</p>	<p><b>Avoid</b></p>	<p>Identification of all possible sites of archaeological value and graves has been identified prior to the commencement of authorised work.</p>	<p>(1) All sites clearly demarcated as no-go areas.           (2) Evidence of records must further discoveries be identified during construction.           (3) Full compliance to all mitigation measures.</p>



<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>27. River crossings</p> <p>30. Vehicular activity on haul roads; and</p>	<p><b>Erosion</b></p>	<p>Loss of fertile soil</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>To prevent any erosion and to provide adequate erosion control measures where required.</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.</p> <p>(2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than 10%.</p> <p>(3) Erosion control measures implemented in high risk areas.</p> <p>(4) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.</p>
		<p>Micro-ecosystems</p>				



<p>operation of mining equipment</p> <p>32. Water Management</p> <p>33. Rehabilitation of mining areas</p>						
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p>	<p>CO<sub>2</sub> emissions</p>	<p>Air Quality</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>The levels of greenhouse gas and CO<sub>2</sub> emissions emanating from the use of plant and vehicles as well as the use of generators for power on site, is kept to a minimum.</p>	<p>(1) All vehicles, plant, and equipment to be serviced as per manufacturer's maintenance schedules.</p> <p>(2) Record keeping of service records of all vehicles, plant, and equipment.</p> <p>(3) No evidence of plant, equipment or vehicles in bad</p>



<p><b>21. RoM &amp; product stockpiling</b></p>						<p>condition.</p>
<p><b>23. Screening Operations</b></p>						
<p><b>28. Water supply (potable &amp; process)</b></p>						
<p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p>						
<p><b>31. Bulk transporting of Ore to market on Public roads</b></p>						



<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19.Opencast mining excavations</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>27. River crossings</b></p> <p><b>32. Water Management</b></p>	<p><b>Alteration of drainage patterns</b></p>	<p>Wetland and Aquatic Ecology</p> <p>Surface Water quality</p>	<p>Construction &amp; Operational</p>	<p><b>Remedy</b></p>	<p>Remedy the possible effects of alteration to natural drainage lines.</p> <p>Compliance with water quality requirements as set by the Water Use Licence Conditions.</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.</p> <p>(2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than 10%.</p> <p>(3) Erosion control measures implemented in high risk areas.</p> <p>(4) No signs of degradation of diversion channels or drainage systems.</p>
<p><b>18.Topsoil and subsoil stripping</b></p>	<p><b>Destruction of upstream</b></p>	<p>Wetland and Aquatic Ecology</p>	<p>Construction &amp; Operational</p>	<p><b>Remedy</b></p>	<p>Remedy the possible effects of destruction of upstream tributaries and reduction in the water catchment.</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.</p>





<p><b>&amp; stockpiling for mining operation area</b></p> <p>19. Opencast mining excavations</p> <p>32. Water Management</p>	<p><b>tributaries and reduction in water in the catchment</b></p>	<p>Downstream water users</p>			<p>Compliance with water quality requirements set by the Water Use Licence Conditions.</p>	<p>(2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than 10%.</p> <p>(3) Erosion control measures implemented in high risk areas.</p> <p>(4) No signs of degradation of diversion channels or drainage systems.</p>
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p>19. Opencast mining excavations</p> <p>21. RoM &amp; product</p>	<p><b>Influx of alien invasive vegetation</b></p>	<p>Fauna and Flora micro and macro ecosystems</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Prevent the spreading of alien plants/seeds on site and to the surrounding areas.</p> <p>Eradication and removal of alien and invasive plants.</p>	<p>(1) No visible presence of alien vegetation on site.</p>



stockpiling						
33. Rehabilitation of mining areas						
19. Opencast mining excavations	Contamination of water resources	Wetlands and Aquatic Ecology	Construction & Operational	Avoid	<p>Avoid the release of pollutants into the aquatic environment.</p> <p>Waste water is appropriately managed.</p> <p>Erosion is prevented. Suitable water management facilities and treatment works are developed and maintained.</p>	<p>(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.</p> <p>(2) No evidence of pollutants released into streams and rivers.</p> <p>(3) No formation of erosion gullies or rills.</p> <p>(4) No leaks or spills caused by inadequate waste water management facilities.</p>
20. Drilling & Blasting						
21. RoM & product stockpiling		Surface Water quality				
22. Residue stockpiles						



23. Screening Operations						
24. Discard disposal (backfilling of mining area)						
25. Waste generation, storage and disposal		Groundwater quality				
26. Chemical Toilets						
27. River crossings						
28. Water supply (potable & process)						
29. Storage of fuel and lubricants in						

(5) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.



temporary facilities						
32. Water Management						
20. Drilling & Blasting	Damage to surrounding landowner properties	Socio-economic	Operational	Avoid	Avoid damage to any surrounding landowner properties, infrastructure or mining equipment.  Avoid any injuries caused by blasting activities.	(1) No signs of damage to surrounding landowner property, infrastructure, or mining equipment.  (2) No injuries caused by blasting activities.
		Human health and safety environment				
22. Residue stockpiles	Hazardous Leachate	Groundwater quality	Operational	Control	Ensure that hazardous leachates are not released into the natural environment.	(1) Exceedance in water quality is limited to 5% of the baseline thresholds. (2) No contamination of water resources.  (3) Reporting of all section 30 of NEMA and section 20
25. Waste generation, storage and disposal		Aquatic ecology				



						of the National Water Act incidents.
25. Waste generation, storage and disposal	Illegal dumping	Surface water contamination	Construction & Operational	Avoid	Promoting the reduction, re-use, or recycle of waste where prevention is not possible.  Disposal of waste to local waste disposal sites is limited.	(1) No littering.
		Human health and safety environment				(2) No unpleasant odours.
		Soil Contamination				(3) Marked and sealable bins observed.  (4) Evidence of waste disposal certificates.
26. Chemical Toilets	Smell nuisance	Human health and safety environment	Construction & Operational	Avoid	Avoid the generation of unpleasant odours on site at all times.	(1) All toilets are serviced.  (2) Sedimentation Ponds containing putrescible waste to be monitored and kept free of odour.  (3) All putrescible waste removed and disposed off in a suitable manner.
28. Water supply (potable &	Improper water storage	Wastage of water resource	Construction &	Avoid	Avoid wastage of water resources.  Maintain all infrastructure associated to the	(1) Abstraction from natural watercourses is kept to a



<p>process)</p> <p><b>32. Water Management</b></p>	<p><b>management</b></p>	<p>Water contamination</p>	<p>Operational</p>		<p>management of domestic water.</p>	<p>minimum and does not exceed the DWAS Water Use Licence provisions by more than 5% on an annual basis</p> <p>(2) No visible signs of leaks or damage to water storage infrastructure.</p> <p>(3) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p>
<p><b>29. Storage of fuel and lubricants in temporary facilities</b></p>	<p><b>Chemical Fires</b></p>	<p>Human health and safety environment</p> <p>Loss of ecosystems</p> <p>Damage to property</p>	<p>Construction &amp; Operational</p>	<p><b>Avoid</b></p>	<p>Avoid and prevent chemical fires.</p> <p>Hazardous spills are prevented and no incidents to human health occur.</p>	<p>(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.</p> <p>(2) Immediate removal and remediation of all spills</p> <p>(3) All staff trained.</p> <p>(4) All hazardous</p>



						<p>substances are documented.</p> <p>(5) No incidents recorded involving chemical fires.</p> <p>(6) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p>
<p><b>31. Bulk transporting of Ore to market on Public roads</b></p>	<p><b>Pressure on public transport infrastructure</b></p>	<p>Socio-economic</p>	<p>Construction &amp; Operational</p>	<p><b>Control</b></p>	<p>Accidents are kept to a minimum.</p> <p>The surface quality of the road is not negatively impacted resulting from haulage of ROM product.</p> <p>The presence of heavy vehicles turning are clearly indicated thereby minimising potential accidents.</p> <p>Sections of existing road surfaces which have been impacted on by the haulage of ROM product are remediated.</p>	<p>(1) No incidents reported of vehicle, pedestrian, and livestock accidents.</p> <p>(2) Condition of road surface maintained</p> <p>(3) No complaints from surrounding landowners or road users.</p> <p>(4) Clearly visibility of warning signage.</p> <p>(5) Existing road surfaces are utilised and maintained within baseline levels.</p>



Decommissioning						
<p>35. Demolition / removal of portable and related infrastructure</p> <p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	<p><b>Hydrocarbon Contamination</b></p>	Surface Water quality	Decommissioning	Control	<p>Adequate protection of soil and water resources.</p> <p>Active remediation in case of spill is ensured.</p>	<p>(1) No evidence of hydrocarbon and hazardous spills.</p> <p>(2) No release of contaminated water into the natural environment.</p> <p>(3) Immediate removal and remediation of all spills.</p> <p>(4) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p> <p>(5) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>
		Groundwater quality				
		Soil quality				





<p>35. Demolition / removal of portable and related infrastructure</p>	<p><b>Dust generation</b></p>	<p>Air Quality</p>	<p>Decommissioning</p>	<p><b>Control</b></p>	<p>Control dust fallout throughout the life cycle of the mining activity.</p>	<p>(1) Dust fallout levels at active operational sites do not exceed the pre-determined baseline levels by more than 10%.</p> <p>(2) Zero number of complaints from site staff, surrounding landowners and communities.</p> <p>(3) Compliance with legal required dust fallout levels.</p> <p>(4) Compliance with 600 mg/m<sup>2</sup> /day averaged over 30 days in residential areas and 1200 mg/m<sup>2</sup> /day averaged over 30 days in non-residential areas.</p> <p>(5) No more than two within a year, no two sequential months per dust fallout monitoring site.</p> <p>(6) If exceeding dust fallout</p>
<p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p>		<p>Human Health</p>				
<p>37. Rehabilitation of the lay down, stockpile and mining areas</p>		<p>Topography and Visual Environment</p>				
<p>38. Demolition of Sedimentation Ponds</p>						
<p>39. Demolition of workshops, waste storage</p>						



<p>facilities, fuel storage facilities etc.</p>						<p>standard, within 3 months after submission of a dust fallout monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>
<p>35. Demolition / removal of portable and related infrastructure  37. Rehabilitation of the lay down, stockpile and mining areas</p>	<p>Degradation of soil resources</p>	<p>Soil quality</p>	<p>Decommissioning</p>	<p><b>Remedy</b></p>	<p>Adequate protection of soil resources and remediation if degradation cannot be avoided.</p>	<p>(1) No evidence of erosion.  (2) No mixing of topsoil or fertile soils with infertile soils.  (3) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.  (4) Implement rehabilitation measures as per the Mine</p>
		<p>Flora micro-ecosystems</p>				



<p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>						<p>Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>
<p>35. Demolition / removal of portable and related infrastructure</p> <p>36. Vehicular activity: removal of mobile plant / equipment and</p>	<p><b>Erosion</b></p>	<p>Loss of fertile soil</p>	<p>Decommissioning</p>	<p><b>Control</b></p>	<p>To prevent any erosion and to provide adequate erosion control measures where required.</p>	<p>(1) No visible signs of erosion formations such as dongas or rills.          (2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than 10%.          (3) Erosion control measures implemented in high risk</p>



<p><b>vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>		<p>Micro-ecosystems</p>				<p>areas.</p> <p>(4) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.</p> <p>(5) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>
<p><b>35. Demolition / removal of portable and related infrastructure</b></p>	<p><b>Noise generation</b></p>	<p>Surrounding noise quality</p>	<p>Decommissioning</p>	<p><b>Control</b></p>	<p>Control potential noise pollution stemming from the decommissioning phase of the project</p>	<p>(1) Ensure equivalent A-weighted noise levels below 55 dBA at potentially noise-sensitive receptors (daytime).</p> <p>(2) Ensure equivalent A-</p>



<p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>						<p>weighted noise levels below 45 dBA at potentially noise-sensitive receptors (night-time).</p> <p>(3) Define the noisy areas with a set boundary ensuring that equivalent A-weighted noise levels at this boundary does not exceed 61 dB LAeq,24hr. It must be noted that the area would have to be demarcated as a “controlled zone” in terms of the NCR;</p> <p>(4) Ensure that the change in ambient sound levels as experienced by Potentially Sensitive Receptors is less than 5 - 7 dBA;</p> <p>(5) Ensuring compliance with the National Noise Control Regulations and SANS10103:2008</p>
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						guidelines. The referencing of the International Finance Corporation (World Bank) guidelines for an acceptable sound level in a residential area was also considered.
<p>35. Demolition / removal of portable and related infrastructure</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	<p><b>General waste generation &amp; Littering</b></p>	<p>Topography and Visual Environment</p> <p>Soils quality due to leachates</p> <p>Surface Water quality due to leachates</p>	<p>Decommissioning</p>	<p><b>Control</b></p>	<p>Promoting the reduction, re-use, or recycle of waste where prevention is not possible.</p> <p>Disposal of waste to local waste disposal sites is limited.</p>	<p>(1) No littering.</p> <p>(2) No unpleasant odours.</p> <p>(3) Marked and sealable bins observed.</p> <p>(4) Evidence of waste disposal certificates</p>



<p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p>	<p><b>CO<sub>2</sub> emissions</b></p>	<p>Air Quality</p>	<p>Decommissioning</p>	<p><b>Control</b></p>	<p>The levels of greenhouse gas and CO<sub>2</sub> emissions emanating from the use of plant and vehicles as well as the use of generators for power on site, is kept to a minimum.</p>	<p>(1) All vehicles, plant, and equipment to be serviced as per manufacturer's maintenance schedules.</p> <p>(2) Record keeping of service records of all vehicles, plant, and equipment.</p> <p>(3) No evidence of plant, equipment or vehicles in bad condition.</p>
<p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p>Wetland and Aquatic Ecology</p>	<p>Decommissioning</p>	<p><b>Control</b></p>	<p>Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation.</p>	<p>(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.</p> <p>(2) Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels.</p> <p>(3) No incidents related to the pollution of rivers and</p>



						streams.  (4) No visible signs of erosion damages.
<b>37. Rehabilitation of the lay down, stockpile and mining areas</b>	<b>Influx of alien invasive vegetation</b>	Fauna and Flora micro and macro ecosystems	Decommissioning	<b>Control</b>	Prevent the spreading of alien plants/seeds on site and to the surrounding areas.  Eradication and removal of alien and invasive plants.	(1) No visible presence of alien vegetation on site.
<b>37. Rehabilitation of the lay down, stockpile and mining areas</b>	<b>Vegetation and habitat loss</b>	Macro and Micro organisms	Decommissioning	<b>Remedy</b>	Avoid unnecessary loss of vegetation and habitats.  Rehabilitation of all affected habitats and mining related areas.	(1) Limiting site clearance to areas as per the approved site layout plan. (2) All sensitive or protected flora identified to be rescued and relocated. (3) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures.  (4) Implement rehabilitation measures as per the Mine
		Fauna and Flora				





						<p>Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p> <p>(5) No unauthorised activities outside of the proposed footprint.</p> <p>(6) Avoid activities in No-Go areas as identified in <b>Appendix L.</b></p>
<p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel</p>	<p>Contamination of water resources</p>	<p>Wetlands and Aquatic Ecology</p> <p>Surface Water quality</p> <p>Groundwater quality</p>	<p>Decommissioning</p>	<p><b>Avoid</b></p>	<p>Avoid the release of pollutants into the aquatic environment.</p> <p>Waste water is appropriately managed. Erosion is prevented.</p> <p>Suitable water management facilities and treatment works are developed and maintained.</p>	<p>(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.</p> <p>(2) No evidence of pollutants released into streams and rivers.</p>



<p><b>storage facilities etc.</b></p>						<p>(3) No formation of erosion gullies or rills.</p> <p>(4) No leaks or spills caused by inadequate waste water management facilities.</p> <p>(5) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.</p> <p>(6) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.</p>
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#### **f) Impact Management Actions**

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

In the previous section management objectives and targets have been established. Table 18 identifies management actions to be implemented in order to reach the defined objectives identified in Table 19.

As part of the Spitsvale Environmental Management System (based on the International ISO 14001:2004 standard) the following additional requirements must be implemented in order to promote continual improvement.

#### ***Develop an Environmental Policy***

The management team of the Spitsvale Mine shall define an organisational environmental Policy and ensure that, within the defined scope of this EMS, it:

- Is appropriate to the nature, scale and environmental impacts of its activities, products and services;
- Includes a commitment to continual improvement and prevention of pollution;
- Includes a commitment to comply with applicable legal requirements and with other requirements to which the Spitsvale Mine subscribes which relate to its environmental aspects;
- Provides the framework for setting and reviewing environmental objectives and targets;
- Is documented, implemented, and maintained;
- Is communicated to all persons working for or on behalf of the Spitsvale Mine; and
- Is available to the public.

#### ***Legal and other requirements***

The management team of the Spitsvale Mine shall establish, implement, and maintain a procedure (s) to:

- Identify and have access to the applicable legal requirements and other requirements to which the organisation subscribes related to its environmental aspects; and
- Determine how these requirements apply to its environmental aspects.

The managerial team of the Spitsvale Mine shall ensure that all the applicable legal requirements identified in Part A section e) or any other legislative requirements published after the approval of this report, to which the project subscribes are taken into account in establishing, implementing, and maintaining the Spitsvale EMS.



### ***Resources, roles, responsibility and authority***

Management shall ensure the availability of resources essential to establish, implement, maintain, and improve the Spitsvale EMS. Resources include human resources and specialised skills, organisational infrastructure, technology and financial resources.

Roles, responsibilities and authorities must be defined, documented and communicated in order to facilitate effective environmental management.

Spitsvale's top management shall appoint a specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities, and authority for:

- Ensuring that an EMS is established, implemented, and maintained in accordance with the requirements stipulated by the Environmental Authorisation and approved EMP; and
- Reporting to top management on the performance of the EMS for review including recommendations for improvement.

### ***Competence, training and awareness***

The management team of the Spitsvale Mine shall ensure that any person(s) performing tasks for it or on its behalf have the potential to cause a significant environmental impact(s) identified by the project is (are) competent on the basis of appropriate education, training, or experience, and shall retain associated records.

Training needs associated with its environmental aspects and its EMS shall be identified. Actions shall be taken to provide the required training to meet the identified needs and records of this shall be kept.

The management of the Spitsvale Mine shall establish, implement, and maintain a procedure(s) to make persons working for it or on its behalf aware of the following:

- The importance of conformity with the established environmental policy, procedures, the EMP, and Environmental Authorisation (EA);
- The significant environmental aspects and related actual or potential impacts associated with their work, and the environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformity with the requirements of the environmental management system; and
- The potential consequences of non-conformities from the specified procedures.



### **Communicate**

With regard to its environmental aspects and the EMS, the management team of the Spitsvale Mine shall establish, implement, and maintain a procedure(s) for:

- Internal communicate among various levels and functions; and
- Receiving, documenting, and responding to relevant communicate from external I&AP.

GN R. 982 (2014 EIA regulations) requires that the compliance of the environmental authorisation, EMPr, and closure plan (in compliance with GN R. 1147) are audited throughout the validity period of those documents.

Section 34 (6) of the 2014 EIA regulation stipulated the following:

*“Within 7 days of the date of submission of an environmental audit report to the competent authority, the holder of an environmental authorisation must notify all potential and registered interested and affected parties of the submission of that report, and make such report immediately available- (a) to anyone on request; and (b) on a publicly accessible website, where the holder has such a website.”*

Therefore in order to comply with the requirement stipulated above, a method of communicating the auditing report shall be established and implemented.

### **Documentation**

The Spitsvale Mine EMS documentation shall include the following:

- The Spitsvale Mine environmental policy and the objectives and targets specified in the EMPr (Table 19);
- Description of the scope of the EMS;
- Description of the main elements of the EMS and their interaction, and reference to related documents;
- Documents, including records required by the EMPr and EA; and
- Documents, including records, determined by the Spitsvale EMS, EMPr and EA to be necessary to ensure effective planning, operation and control of processes that relate to its significant environmental aspects.

### **Operational Control**

The identified significant environmental impacts and/or risk as specified in Part A of this report must be managed by identifying and planning those operations associated to each impact and/or risk that are



consistent with the developed environmental policy, objectives and targets, in order to ensure that they are carried out under specified conditions, by:

- Establishing, implementing and maintaining a documented procedure(s) to control situations where their absence could lead to deviation from the environmental policy, objectives and targets;
- Stipulating the operating criteria in the procedure(s); and
- Establishing, implementing and maintaining procedures related to the identified significant environmental aspects of goods and services used by the Spitsvale Mine and communicating applicable procedures and requirements to suppliers, including contractors or sub-contractors.

### ***Emergency preparedness and response***

Procedure(s) to identify potential emergency situations and potential accidents that can have an impact(s) on the environment and methods of respond to them shall be established, implemented and maintained.

All actual emergency situations and accidents shall be responded to immediately and preventative or mitigation measures associated to the adverse environmental impacts shall be implemented.

This document shall be reviewed periodically and, where necessary, revise its emergency preparedness and response procedure, in particular, after the occurrence of accidents or emergency situations.

The Emergency preparedness and response plan shall also periodically test such procedures where practicable.

### ***Monitoring and measurement***

As part of the Spitsvale Mine's EMS, a procedure(s) to monitor and measure, on a regular basis, the key characteristics of the activities that can have a significant environmental impact must be established, implemented and maintained. This procedure shall include the documenting of information to monitor performance, applicable operational controls and conformity with the established objectives and goals.

### ***Evaluation of compliance***

In addition to the auditing requirements set by GN R. 982, the Spitsvale Mine shall establish, implement and maintain a procedure for periodically evaluating compliance with all requirements set out in the developed Spitsvale EMS, the approved EMP, EA, and closure plan (complying with the requirements set by GN R. 1147). Records of these results must be kept and communicated to all responsible persons.



### ***Nonconformity, corrective action and preventative action***

A procedure for dealing with actual and potential nonconformities and for taking corrective and preventative actions shall be established, implemented, and maintained. This procedure should include and define the following requirements:

- Identifying and correcting nonconformity (ies) and taking action(s) to mitigate their environmental impacts;
- Investigating nonconformity(ies), determining their cause(s) and taking actions in order to avoid their recurrence;
- Evaluating the need for action(s) to prevent nonconformity(ies) and implementing appropriate actions designed to avoid their occurrence;
- Recording the results of corrective action(s) and preventative action(s) taken; and
- Reviewing the effectiveness of corrective action(s) and preventative action(s).

The actions to be implemented shall be appropriate to the magnitude of the problems and the environmental impacts encountered.

### ***Internal Audit***

As discussed in previous sections, GN R. 982 (2014 EIA regulations) requires that compliance with the environmental authorisation, environmental management programme and the closure plan be submitted to the competent authority. However, this shall not be the only audit report generated throughout the life cycle of the Spitsvale Mine.

A internal audit of the Spitsvale EMS is recommended to be conducted on a biannual (at least once before submitting independent audit report to the competent authority) basis, if found to be feasible. The purpose of these audits will be as follows:

- Determine whether the EMS conforms to the planned arrangements for environmental management including the requirements set out by the EMP, EA, and closure plan;
- The EMS has been properly implemented and is maintained; and
- Provide information on the results of audits to be managed.

The purpose of the audit report is as follows:

- To describe findings or nonconformity(ies);
- Communicate compliance status to responsible persons;
- To determine compliance status with the EMP, EA, and closure plan;



- Indicate areas requiring improvement; and
- Determine the accuracy of documented procedures and mitigation measures.

This audit must be conducted by an appointed suitably qualified person with the expertise of environmental management.

### ***Management Review***

Top management shall review the Spitsvale EMS at planned intervals (recommended to occur at least biannually), to ensure its continuing suitability, adequacy and effectiveness. Reviews shall include assessing opportunities for improvement and the need for changes to the EMS, EMPr, EA, and closure plan. Records of these review meeting must be documented and kept.

Input to management reviews shall include:

- Results of internal audits and evaluations of compliance with legal and other requirements;
- Communicate from external I&AP, including complaints;
- The environmental performance of the Spitsvale Mine;
- The extent to which objectives and targets have been met;
- Status of corrective and preventative actions;
- Follow-up actions from previous management reviews;
- Changing circumstances, including development in legal and other requirements related to its environmental aspects; and
- Recommendations for improvement.

The outputs from the management reviews shall include any decisions and actions related to possible changes to environmental policy, objectives and targets and other elements of the EMS, EMPr, EA, and closure plan, consistent with the commitment to continual improvement.





Table 20: Recommended management actions to be implemented to ensure objectives and targets are reached

ACTIVITY whether listed or not listed. (E.g. 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...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	MITIGATION <b>TYPE</b> (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. □ Modify through alternative method. □ Control through noise control □ Control through management and monitoring  Remedy through rehabilitation..	TIME PERIOD FOR IMPLEMENT Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	COMPLIANCE WITH STANDARDS (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
<b>Construction Phase</b>				
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p> <p>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</p>	Dust generation	<b>Control</b>	<p>(1) Measures must be implemented when required during the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement a Dust management plan as part of an Air quality management plan to including the monitoring and prevention programme.</p> <p>(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014.</p> <p>(3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQA).</p> <p>(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009)</p> <p>(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)</p>
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and</p>	Hydrocarbon Contamination	<b>Control</b>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire</p>	<p>(1) Develop a water management plan addressing monitoring and management requirements.</p> <p>(2) Develop a storm water management plan addressing the separation of "dirty" and clean "areas".</p> <p>(3) Develop a emergency response plan with specific reference to spill prevention and remediation.</p> <p>(4) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of</p>



<p><b>all related mining infrastructure</b></p> <p><b>3. Weigh bridge</b></p> <p><b>6. Storm water runoff management features</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p> <p><b>16. Use of existing drilled / new boreholes</b></p>			<p>life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>plant/vehicles/equipment for leaks or breakages.</p> <p>(5) Develop and implement a Hazardous substances management plan.</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p>	<p><b>Degradation of soil resources</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop a soil conservation management plan.</p> <p>(2) Develop a storm water management plan.</p> <p>(3) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p>



<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>6. Storm water runoff management features</p> <p>15. Transport of construction material, mobile plant and equipment to the site</p>	<p><b>Erosion</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop a soil conservation management plan.</p> <p>(3) Develop and implement a mine rehabilitation plan.</p>
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>6. Storm water runoff management features</p>	<p><b>Vegetation and habitat loss</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p>	<p>(1) Develop a plant species search and rescue management plan.</p> <p>(2) Develop and implement a phased rehabilitation management plan.</p> <p>(3) Develop and implement a soil conservation management plan.</p> <p>(4) Apply for permits to remove protected species (provincial and national).</p>
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and</p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire</p>	<p>(1) Develop a storm water management plan.</p> <p>(2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.</p>



<p><b>all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p>			<p>life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Reporting of incidents within 48h to the competent authority</p>	
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p>	<p><b>Noise generation</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines.</p> <p>(2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Alteration of drainage patterns</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement a storm water management plan</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>



<p><b>6. Storm water runoff management features</b></p>			<p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p><b>Destruction of upstream tributaries and reduction in water in the catchment</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p><b>Water usage for dust suppression</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement a Dust management plan including the monitoring and prevention programme.</p> <p>(2) Develop and implement a water usage record keeping procedure.</p>



<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>	<p>Influx of alien invasive vegetation</p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate removal of all alien invasive species</p>	<p>(1) Develop and implement an alien eradication and control management plan.</p>
<p>1. Access and hauling along roads i.e. during the construction of roads</p> <p>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</p> <p>9. Stores, workshops &amp; wash bays</p> <p>11. Fuel operating power generators</p> <p>15. Transport of construction material, mobile plant and equipment to the site</p>	<p>CO<sub>2</sub> emissions &amp; Release of noxious gasses</p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and maintain a Carbon footprint reporting policy.</p>



<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p>	<p><b>Topography and visual alteration</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Mine plan in accordance with the MPRDA Regulation 56 section (1) to (8).</p> <p>(2) Adherence to the finalised approved lay out plan.</p> <p>(3) Develop and implement the phased mine rehabilitation management plan.</p>
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>16. Use of existing drilled / new boreholes</b></p>	<p><b>Water level reduction and contamination</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p> <p>(5) Reporting of incidents within 48h to the competent authority</p>	<p>(1) Develop and implement a water management plan and specifically include measures to be implemented to reduce the impact on surface and groundwater reduction.</p> <p>(2) Ensure compliance with the issued WUL requirements.</p> <p>(3) Develop and implement a storm waste management plan and specifically address the diversion of "clean" water into the natural drainage lines.</p>



<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Destruction of graves</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate reporting of incidents to the NHRA</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Degradation of cultural significance heritage sites</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate reporting of incidents to the NHRA</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>
<p><b>4. Onsite Clinic</b></p>	<p><b>Medical Waste generation</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop a Health and Safety management plan specifically addressing the management of medical waste.</p> <p>(2) Develop a management plan for the operation of the on-site Clinic.</p> <p>(3) Develop and implement a detailed Waste management plan.</p>
<p><b>4. Onsite Clinic</b> <b>5. Mining offices (construction and operation) i.e. operation of</b></p>	<p><b>Electricity usage</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p>	<p>(1) Develop and implement an electricity usage monitoring programme.</p> <p>(2) Develop and implement a carbon footprint reporting policy.</p>





<p>training centres, offices and kitchen facilities</p> <p>12. Lighting</p>			<p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	
<p>4. Onsite Clinic</p> <p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>	<p>Domestic water usage</p>	<p>Avoid</p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement a water usage record keeping procedure.</p> <p>(2) Develop and implement an infrastructure maintenance programme to include frequent inspections of water pipes and taps.</p>
<p>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</p>	<p>General waste generation &amp; Littering</p>	<p>Control</p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a Waste Management plan.</p> <p>(2) Recording of all waste generated by authorised activities.</p>
<p>7. Water storage facilities</p>	<p>Improper water storage management</p>	<p>Avoid</p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a water management plan specifically addressing the storage of water as well as the frequent inspections of storage facilities.</p>



<p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p>	<p><b>Contamination of water resources</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Reporting of incidents within 48h to the competent authority</p>	<p>(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water monitoring schedule according to the water management plan.</p> <p>(2) Ensure compliance with the WUL conditions.</p> <p>(3) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.</p>
<p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p>	<p><b>Smell nuisance</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Reporting of incidents within 48h to the competent authority</p>	<p>(1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets.</p> <p>(2) Develop and implement an Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste.</p> <p>(3) Develop and implement a Waste Management plan.</p>
<p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p>	<p><b>Chemical Fires</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a fire prevention plan that includes measures of prevention and response to chemical fires.</p> <p>(2) Develop an emergency preparedness procedure and include the process to be followed in case of a chemical fire.</p> <p>(3) Develop a Hazardous substances management plan.</p> <p>(4) Develop a frequent inspection programme to include inspections of hazardous substances storage facilities.</p>



			(4) Reporting of incidents within 48h to the competent authority	
<b>12. Lighting</b>	<b>Light pollution</b>	<b>Control</b>	(1) Biennial investigation and reporting	(1) Biennial investigation of the impact of Light pollution to nocturnal species.
<b>13. Fuel storage</b>	<b>Emission of noxious fumes</b>	<b>Avoid</b>	(1) Mitigation measures must be implemented for the complete duration of the activities listed  (2) Ongoing monitoring of compliance throughout the entire life cycle of the project  (3) Immediate remediation actions in the event of an incident	(1) Develop and implement a Hazardous substance management plan addressing Compliance to applicable SANS standards for the storage of fuel.  (2) Develop and implement an infrastructure inspection schedule and programme and include the inspections of fuel storage facilities.  (3) Develop and implement a Health and Safety Management plan.  (4) Develop an Emergency preparedness plan addressing prevention and mitigation of incidents.
<b>14. Employment of workers and procurement of construction materials.</b>	<b>Loss of farm labour</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.
	<b>Population Influx – Pressure on Resources</b>	<b>Control</b>	(1) Mitigation measures must be implemented for the complete duration of the activities listed	(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.
	<b>Population Influx – Social Pathologies</b>	<b>Control</b>	(2) Ongoing monitoring of compliance throughout the entire life cycle of the project	(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.
	<b>Population Influx – Community Conflict</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.
	<b>Health and Safety of employees</b>	<b>Control</b>		(1) Develop and implement a Health and Safety Management plan.
	<b>Job Creation and Skills Training</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA.  (2) Develop and implement a grievance lodging procedure.



	<b>Job Creation (Multiplier affect) and Population Influx</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
<b>Operational Phase</b>				
<b>17. Employment of workers</b>	<b>Loss of farm labour</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
	<b>Population Influx – Pressure on Resources</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
	<b>Population Influx – Social Pathologies</b>	<b>Control</b>	(1) Mitigation measures must be implemented for the complete duration of the activities listed	(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
	<b>Population Influx – Community Conflict</b>	<b>Control</b>	(2) Ongoing monitoring of compliance throughout the entire life cycle of the project	(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
	<b>Health and Safety of employees</b>	<b>Control</b>		(1) Develop and implement a Health and Safety Management plan.
	<b>Job Creation and Skills Training</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
	<b>Job Creation (Multiplier affect) and Population Influx</b>	<b>Control</b>		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
<b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b> <b>19. Opencast mining excavations</b> <b>20. Drilling &amp; Blasting</b> <b>21. RoM &amp; product stockpiling</b>	<b>Dust generation</b>	<b>Control</b>	(1) Measures must be implemented when required during the activities listed  (2) Ongoing monitoring of compliance throughout the entire life cycle of the project	(1) Develop and implement a Dust management plan as part of a Air quality management plan to including the monitoring and prevention programme. (2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014.  (3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQA. (4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.  (5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009)



<p>22. Residue stockpiles</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>30. Vehicular activity on haul roads; and operation of mining equipment</p> <p>31. Bulk transporting of Ore to market on Public roads</p>				<p>(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)</p>
<p>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19.Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>22. Residue stockpiles</p>	<p>Alteration of the visual environment and topography</p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Mine plan in accordance with the MPRDA Regulation 56 section (1) to (8).</p> <p>(2) Adherence to the finalised approved lay out plan.</p> <p>(3) Develop and implement the phased mine rehabilitation management plan.</p>
<p>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19.Opencast mining</p>	<p>Degradation of soil resources</p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire</p>	<p>(1) Develop a soil conservation management plan.</p> <p>(2) Develop a storm water management plan.</p> <p>(3) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p>



<p><b>excavations</b></p> <p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>25. Waste generation, storage and disposal</b></p> <p><b>26. Chemical Toilets</b></p> <p><b>29. Storage of fuel and lubricants in temporary facilities</b></p> <p><b>33. Rehabilitation of mining areas</b></p>			<p>life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>33. Rehabilitation of mining areas</b></p>	<p><b>Vegetation and habitat loss</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p>	<p>(1) Develop a plant species search and rescue management plan.</p> <p>(2) Develop and implement a phased rehabilitation management plan.</p> <p>(3) Develop and implement a soil conservation management plan.</p> <p>(4) Apply for permits to remove protected species (provincial and national).</p>



<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Destruction of Wetlands</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Develop and implement a water management plan and specifically include the conservation measures to be implemented in wetland areas.</p> <p>(2) Ensure compliance with the issued WUL requirements.</p>
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>27. River crossings</b></p> <p><b>29. Storage of fuel and</b></p>	<p><b>Hydrocarbon Contamination</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop a water management plan addressing monitoring and management requirements.</p> <p>(2) Develop a storm water management plan addressing the separation of "dirty" and clean "areas".</p> <p>(3) Develop an emergency response plan with specific reference to spill prevention and remediation.</p> <p>(4) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p> <p>(5) Develop and implement a Hazardous substances management plan.</p>



<p><b>lubricants in temporary facilities</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p>				
<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19.Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>27. River crossings</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>32. Water Management</b></p> <p><b>33. Rehabilitation of mining areas</b></p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Reporting of incidents within 48h to the competent authority</p>	<p>(1) Develop a storm water management plan.</p> <p>(2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.</p>
<p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Water level reduction and contamination</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p>	<p>(1) Develop and implement a water management plan and specifically include measures to be implemented to reduce the impact on surface and groundwater reduction.</p> <p>(2) Ensure compliance with the issued WUL requirements.</p> <p>(3) Develop and implement a storm water management plan and specifically address the diversion of "clean" water into the natural</p>





<p>27. River crossings</p> <p>28. Water supply (potable &amp; process)</p> <p>32. Water Management</p>			<p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p> <p>(5) Reporting of incidents within 48h to the competent authority</p>	<p>drainage lines.</p>
<p>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19.Opencast mining excavations</p> <p>20.Drilling &amp; Blasting</p> <p>21. RoM &amp; product stockpiling</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>30. Vehicular activity on haul roads; and operation of mining equipment</p> <p>33. Rehabilitation of mining areas</p>	<p>Noise generation</p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines.</p> <p>(2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.</p>
<p>18.Topsoil and subsoil stripping &amp; stockpiling for mining</p>	<p>Destruction of graves</p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete</p>	<p>(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.</p> <p>(2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).</p>



operation area			duration of the activities listed  (2) Ongoing monitoring of compliance throughout the entire life cycle of the project  (3) Immediate reporting of incidents to the NHRA	
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Degradation of cultural significance heritage sites	<b>Avoid</b>	(1) Mitigation measures must be implemented for the complete duration of the activities listed  (2) Ongoing monitoring of compliance throughout the entire life cycle of the project  (3) Immediate reporting of incidents to the NHRA	(1) Ensure compliance with the National Heritage Resources Act (NHRA), No. 25 of 1999.  (2) Ensure compliance with the Human Tissue Act, 1983 (Act no. 65 of 1983).
18.Topsoil and subsoil stripping & stockpiling for mining operation area  19.Opencast mining excavations  21. RoM & product stockpiling  24. Discard disposal (backfilling of mining area)  27. River crossings  30. Vehicular activity on haul roads; and operation of mining equipment  32. Water Management  33. Rehabilitation of mining	Erosion	<b>Control</b>	(1) Mitigation measures must be implemented for the complete duration of the activities listed  (2) Ongoing monitoring of compliance throughout the entire life cycle of the project  (3) Immediate remediation actions in the event of an incident	(1) Develop and implement a storm water management plan.  (2) Develop a soil conservation management plan.  (3) Develop and implement a mine rehabilitation plan.



areas				
18. Topsoil and subsoil stripping & stockpiling for mining operation area 19. Opencast mining excavations 21. RoM & product stockpiling 23. Screening Operations 28. Water supply (potable & process) 30. Vehicular activity on haul roads; and operation of mining equipment 31. Bulk transporting of Ore to market on Public roads	CO <sub>2</sub> emissions	Control	(1) Mitigation measures must be implemented for the complete duration of the activities listed (2) Ongoing monitoring of compliance throughout the entire life cycle of the project	(1) Develop and maintain a Carbon footprint reporting policy.
18. Topsoil and subsoil stripping & stockpiling for mining operation area 19. Opencast mining excavations 22. Residue stockpiles 27. River crossings 32. Water Management	Alteration of drainage patterns	Remedy	(1) Mitigation measures must be implemented for the complete duration of the activities listed (2) Ongoing monitoring of compliance throughout the entire life cycle of the project (3) Immediate remediation actions in the event of an incident (4) Immediate re-vegetation on completion of listed activity (5) Immediate rehabilitation measures to be implemented on the completion of listed activity.	(1) Develop and implement a storm water management plan. (2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.



<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>32. Water Management</p>	<p>Destruction of upstream tributaries and reduction in water in the catchment</p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop and implement a water management plan specifically including a strategy for the management of alterations to drainage patterns.</p>
<p>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</p> <p>19. Opencast mining excavations</p> <p>21. RoM &amp; product stockpiling</p> <p>33. Rehabilitation of mining areas</p>	<p>Influx of alien invasive vegetation</p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate removal of all alien invasive species</p>	<p>(1) Develop and implement an alien eradication and control management plan.</p>
<p>19. Opencast mining excavations</p> <p>20. Drilling &amp; Blasting</p> <p>21. RoM &amp; product stockpiling</p>	<p>Contamination of water resources</p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water monitoring schedule according to the water management plan.</p> <p>(2) Ensure compliance with the WUL conditions.</p> <p>(3) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.</p>



<p>22. Residue stockpiles</p> <p>23. Screening Operations</p> <p>24. Discard disposal (backfilling of mining area)</p> <p>25. Waste generation, storage and disposal</p> <p>26. Chemical Toilets</p> <p>27. River crossings</p> <p>28. Water supply (potable &amp; process)</p> <p>29. Storage of fuel and lubricants in temporary facilities</p> <p>32. Water Management</p>			<p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Reporting of incidents within 48h to the competent authority</p>	
<p>20. Drilling &amp; Blasting</p>	<p>Damage to surrounding landowner properties</p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Health and safety act, act 29 of 1996.</p> <p>(2) Explosives Act, act 15 of 2003.</p>
<p>22. Residue stockpiles</p> <p>25. Waste generation, storage and disposal</p>	<p>Hazardous Leachate</p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of</p>	<p>(1) Develop and implement a Waste Management plan.</p> <p>(2) Develop and implement an Integrated Waste Water Management plan.</p>



			<p>compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Reporting of incidents within 48h to the competent authority</p>	
<p><b>25. Waste generation, storage and disposal</b></p>	<p><b>Illegal dumping</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.</p>
<p><b>26. Chemical Toilets</b></p>	<p><b>Smell nuisance</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets.</p> <p>(2) Develop and implement an Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste.</p> <p>(3) Develop and implement a Waste Management plan.</p>
<p><b>28. Water supply (potable &amp; process)</b></p> <p><b>32. Water Management</b></p>	<p><b>Improper water storage management</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire</p>	<p>(1) Develop and implement a water management plan specifically addressing the storage of water as well as the frequent inspections of storage facilities.</p>



			<p>life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	
<p><b>29. Storage of fuel and lubricants in temporary facilities</b></p>	<p><b>Chemical Fires</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Reporting of incidents within 48h to the competent authority</p>	<p>(1) Develop and implement a fire prevention plan that includes measures of prevention and response to chemical fires.</p> <p>(2) Develop an emergency preparedness procedure and include the process to be followed in case of a chemical fire.</p> <p>(3) Develop a Hazardous substances management plan.</p> <p>(4) Develop a frequent inspection programme to include inspections of hazardous substances storage facilities.</p>
<p><b>31. Bulk transporting of Ore to market on Public roads</b></p>	<p><b>Pressure on public transport infrastructure</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement a traffic management plan.</p> <p>(2) Develop and implement a Public Complaints procedure.</p>
<b>Decommissioning Phase</b>				
<p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p>	<p><b>Hydrocarbon Contamination</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on</p>	<p>(1) Develop a water management plan addressing monitoring and management requirements.</p> <p>(2) Develop a storm water management plan addressing the separation of "dirty" and clean "areas".</p> <p>(3) Develop an emergency response plan with specific reference to spill prevention and remediation.</p> <p>(4) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p> <p>(5) Develop and implement a Hazardous substances management plan.</p>



<p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>			<p>completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	
<p>35. Demolition / removal of portable and related infrastructure</p> <p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p> <p>37. Rehabilitation of the lay down, stockpile and mining areas</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	<p>Dust generation</p>	<p>Control</p>	<p>(1) Measures must be implemented when required during the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and implement a Dust management plan as part of a Air quality management plan to including the monitoring and prevention programme.</p> <p>(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by Act no 20 of 2014.</p> <p>(3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQA).</p> <p>(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.</p> <p>(5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).</p> <p>(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)</p>
<p>35. Demolition / removal of portable and related infrastructure</p> <p>37. Rehabilitation of the lay down, stockpile and mining areas</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	<p>Degradation of soil resources</p>	<p>Remedy</p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation</p>	<p>(1) Develop a soil conservation management plan.</p> <p>(2) Develop a storm water management plan.</p> <p>(3) Develop and implement a vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.</p>





			measures to be implemented on the completion of listed activity.	
<p>35. Demolition / removal of portable and related infrastructure</p> <p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p> <p>37. Rehabilitation of the lay down, stockpile and mining areas</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	Erosion	Control	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Develop and implement a storm water management plan.</p> <p>(2) Develop a soil conservation management plan.</p> <p>(3) Develop and implement a mine rehabilitation plan.</p>
<p>35. Demolition / removal of portable and related infrastructure</p> <p>36. Vehicular activity: removal of mobile plant / equipment and vehicles</p> <p>38. Demolition of Sedimentation Ponds</p> <p>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</p>	Noise generation	Control	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	<p>(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines.</p> <p>(2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.</p>
<p>35. Demolition / removal of portable and related</p>	General waste generation & Littering	Control	<p>(1) Mitigation measures must be implemented for the complete</p>	<p>(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.</p>



<p><b>infrastructure</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>			<p>duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p>	
<p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p>	<p><b>CO<sub>2</sub> emissions</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p>	<p>(1) Develop and maintain a Carbon footprint reporting policy.</p>
<p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p> <p>(5) Immediate rehabilitation measures to be implemented on the completion of listed activity.</p>	<p>(1) Develop a storm water management plan.</p> <p>(2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.</p>
<p><b>37. Rehabilitation of the lay down, stockpile and mining</b></p>	<p><b>Influx of alien invasive vegetation</b></p>	<p><b>Control</b></p>	<p>(1) Mitigation measures must be implemented for the complete</p>	<p>(1) Develop and implement an alien eradication and control management plan.</p>



<p><b>areas</b></p>			<p>duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate removal of all alien invasive species</p>	
<p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p>	<p><b>Vegetation and habitat loss</b></p>	<p><b>Remedy</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Immediate re-vegetation on completion of listed activity</p>	<p>(1) Develop a plant species search and rescue management plan.</p> <p>(2) Develop and implement a phased rehabilitation management plan.</p> <p>(3) Develop and implement a soil conservation management plan.</p> <p>(4) Apply for permits to remove protected species (provincial and national).</p>
<p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>	<p><b>Contamination of water resources</b></p>	<p><b>Avoid</b></p>	<p>(1) Mitigation measures must be implemented for the complete duration of the activities listed</p> <p>(2) Ongoing monitoring of compliance throughout the entire life cycle of the project</p> <p>(3) Immediate remediation actions in the event of an incident</p> <p>(4) Reporting of incidents within 48h to the competent authority</p>	<p>(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP).</p> <p>(2) Develop and implement a water monitoring schedule according to the water management plan.</p> <p>(3) Ensure compliance with the WUL conditions.</p> <p>(3) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.</p>



## i) Financial Provision

As part of the Spitsvale Mine Rehabilitation closure and Liability plan (attached as **Appendix U**), the financial provision for the mining operations were determined based on information currently available.

### (1) Determined amount for Financial Provision

An assessment was conducted of all the infrastructure and activities taking place on site that fall within the properties associated to the mining right application. The infrastructure was classified in accordance with the tariffs list and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. A separate calculation was done to include the costs associated with Phase 1 (including laydown area 1, Klarinet Koppie opencast pit and the associated ROM stockpiles). A supplementary calculation was done to incorporate Phase 2 & 3 and a second laydown area. These extensions are planned as part of the next phases of the project and will only commence once phase 1 mining operations have ceased.

The premature quantum was calculated using the demolition and rehabilitation rates and has been calculated as **R 6 140 648.41 (including P&G, contingency and excluding VAT)** for the physical and biophysical components associated with the current activities and infrastructure on the site. This related to Open pit 1, Laydown area 1, Ore stockpile area, ROM stockpile area and roads.

It is evident that the biophysical component of rehabilitation makes for 100% of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of the biophysical component. The physical rehabilitation (demolition and removal of structures) amounts to 0% of the liability cost. For the reason that all infrastructure will either be removed off site by the mining contractor or be taken over by the community. Therefore, the biophysical component contributes solely to the calculated closure costs for premature closure. A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

The community have expressed an interest in some of the physical infrastructure, such as some of the laydown area buildings, the access and haul roads as well as the ROM stockpile's footprints for future use.

A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

The quantum calculated for all activities and infrastructure associated with the entire Spitsvale Mine (including mining of phase 2 and 3 and the associated infrastructure) was calculated as **R8 699 326.49 (including P&G, contingency and**



**excluding VAT**). The increase in biophysical costs (between the current and proposed costs) can be attributed to the addition of two opencast pits, with their associated infrastructure, in the future. All physical infrastructure to be constructed in the future will also be either removed upon closure by the mining contractor or given to the community.

The costing sheets have been reviewed externally by a registered financial institution for correctness regarding the calculations. Based on the current information it is estimated that the accuracy level of the phase 1 calculation is 95% and the accuracy level of the calculation of the future mining development is 50%.

The detailed mine closure cost assessment report is attached as an Appendix C to **Appendix U**.

**(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein**

A conceptual closure plan for the existing mining licence application has been developed for the Spitsvale Mine. The closure of the mine is guided by the closure vision that was developed for the mine's conceptual closure plan, with the closure objectives and post closure strategy developed to support the vision.

As the vision covers the mine lease area, it is reasonable that the vision will extend to any new areas included in the mining licence. The closure vision is therefore: BCR Minerals (Pty) Ltd will develop a sustainable post closure environment that is not harmful to the safety and health of surrounding communities, where prospects to utilize infrastructure after closure are maximized and where final post closure land use is optimized so that there is no net negative loss of biodiversity.

Find **Appendix U** for the detailed closure plan.

**(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties**

During the finalisation of the Spitsvale Mine Rehabilitation, Closure, and Liability plan (**Appendix U**), the landowners were invited for discussions on their current and future proposed land use of the affected areas, as well as challenges they currently have with rangeland management and its possible risk to future liabilities of the mine. A compilation of these discussions, together with an attendance register, is presented in **Appendix U**.

**(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure**

Find **Appendix U**.

**(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives**

Find **Appendix U**.



**(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline**

The detailed mine closure cost assessment report is attached as an Appendix C to **Appendix U**.

***Process followed to calculate and state the quantum of financial provision required***

Most of the information used for the quantum calculation was obtained from the draft closure plan, the prospecting rights and associated EMP's. Various images and the most recent Google earth imagery were used, as found in specialists' reports, to identify and mark the entire related infrastructure. Once this was complete a list of all the infrastructure was compiled. The infrastructure was classified in accordance with the tariffs list (as listed in the detailed mine cost assessment report) and the surface areas of the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. A detailed list is available in **Appendix U**.

***Closure cost calculations***

The premature quantum was calculated using the demolition and rehabilitation rates and has been calculated as **R 6 140 648.41 (including P&G, contingency and excluding VAT)** for the physical and biophysical components associated with the current activities and infrastructure on the site. This related to Open pit 1, Laydown area 1, Ore stockpile area, ROM stockpile area and roads.

It is evident that the biophysical component of rehabilitation makes for 100% of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of the biophysical component. The physical rehabilitation (demolition and removal of structures) amounts to 0% of the liability cost. For the reason that all infrastructure will either be removed off site by the mining contractor or be taken over by the community. Therefore, the biophysical component contributes solely to the calculated closure costs for premature closure. A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

A cost estimate has been included for the current and future activities. The assumption made with regards to placement of waste rock in the future activities is that a starter waste rock dump will be constructed and as soon as mining allows it, the waste rock will be backfilled into the pit area. This will be done as part of operational cost. Thus no waste rock dumps will remain subsequent to mining operations ceasing.

The quantum calculated for all activities and infrastructure associated with the entire Spitsvale Mine (including mining of phase 2 and 3 and the associated infrastructure) was calculated as **R8 699 326.49 (including P&G, contingency and excluding VAT)**. The increase in biophysical costs (between the current and proposed costs) can be attributed to the



addition of two opencast pits, with their associated infrastructure, in the future. All physical infrastructure to be constructed in the future will also be either removed upon closure by the mining contractor or given to the community.

The costing sheets have been reviewed externally by a registered financial institution for correctness regarding the calculations. Based on the current information it is estimated that the accuracy level of the phase 1 calculation is 95% and the accuracy level of the calculation of the future mining development is 50%.

The detailed mine closure cost assessment report is attached as an Appendix C to **Appendix U**.

**(f) Confirm that the financial provision will be provided as determined**

Find attached **Appendix X** a copy of the confirmation submitted to the DMR.



### **Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including**

- Monitoring of Impact Management Actions
- Monitoring and reporting frequency
- Responsible persons
- Time period for implementing impact management actions
- Mechanism for monitoring compliance

As part of the Spitsvale Mine's EMS, a procedure(s) to monitor and measure, on a regular basis, the key characteristics of the activities that can have a significant environmental impact must be established, implemented and maintained.

This procedure shall include:

- The documenting of information to monitor performance
- Applicable operational controls and conformity with the established objectives and goals
- Procedure to address the recommendations made in Table 21

It is recommended that a legal compliance and EMS audit be regularly conducted by professional consultants throughout the life of the mine, to monitor the compliance with requirements set out in the EMPr, EA, and closure plan. The outcome of this audit must be as follows:

- Advise on any mitigation measures which need to be added to the existing programmes
- Communicate of findings to Mine management
- Communicating environmental progress on the set objectives and targets in both the EMPr and closure plan
- Status of legal compliance with specific reference to the National Water Act (Act No. 36 of 1998), the MPRDA, NEMA, and the Mine health and safety act (Act no 29 of 1996)

The audit must take into consideration the management principles and strategies stated in the Environmental Management Programme, and assess whether this strategy is providing the required results. Any flaws found in the rehabilitation process will be included in the Report along with the recommended mitigation measures.

In section **1) e)** it is recommended that an internal audit of the Spitsvale EMS is be conducted on a biannual (at least once before submitting independent audit report to the competent authority) basis, if found to be feasible.





Table 17: Recommended mechanisms for monitoring compliance with and performance assessment against the EMP

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>8. Sedimentation Ponds (pollution containment ponds)</b></p>	<p><b>Dust generation</b></p>	<p>The developed Air Quality management plan must include the following:</p> <ul style="list-style-type: none"> <li>• Methods of controlling dust generation</li> <li>• Identifying sensitive receptors and monitoring points</li> </ul> <p>It is recommended that baseline monitoring of dust fallout, PM10 and PM2.5 is conducted at the site for a period of at least 12 months.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of Air quality management plan as or when required</p> <p>(2) Monthly monitoring of compliance with the NEMAQA regulations</p> <p>(3) Once-off registration on the online NAEIS systems thereafter reporting as specified</p>



<p><b>i.e. Construction and operation</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>31. Bulk transporting of Ore to market on Public roads</b></p> <p><b>35. Demolition / removal of portable and related</b></p>				
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<p><b>infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p> <p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p>				
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<p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>				
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>3. Weigh bridge</b></p> <p><b>6. Storm water runoff management features</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p> <p><b>15. Transport of construction</b></p>	<p><b>Hydrocarbon Contamination</b></p>	<p>Regular inspections of areas prone to hydrocarbon spills and contamination must be inspected on a regular basis.</p> <p>Contamination the affected environment will require remediation actions.</p> <p><b>Soil contamination</b></p> <p>After completion of remediation actions it is recommended that samples be taken to ensure the soil quality comply with the rehabilitation objectives.</p> <p><b>Water contamination</b></p> <p>Water samples must be taken to ensure compliance with legal thresholds and the baseline data as specified in <b>Appendix P &amp; G.</b></p> <p>Records to be kept of monitoring activities.</p>	<p>(1) All staff          (2) Environmental Control Officer/Environmental Officer/ SHEQ Officer          (3) Project Management</p>	<p>(1) Review of the Water management plan as or when required</p> <p>(2) Review of Storm water Management plan as or when required</p> <p>(3) Annual review of the Emergency preparedness and response plan or review after occurrence of emergency incident</p> <p>(4) Review of vehicle/plan/equipment maintenance plan as or when required</p> <p>(5) Daily inspections of vehicles/plant/equipment</p> <p>(6) Weekly inspections of</p>



<p><b>material, mobile plant and equipment to the site</b></p> <p><b>16. Use of existing drilled / new boreholes</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>27. River crossings</b></p> <p><b>29. Storage of fuel and lubricants in temporary facilities</b></p> <p><b>30. Vehicular activity on haul</b></p>				<p>hazardous substances storage facilities</p> <p>(7) Review of Hazardous substances management plan as or when required</p> <p>(8) Weekly inspections of spill prevention equipment</p>
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<p><b>roads; and operation of mining equipment</b></p> <p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>				
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<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>9.Stores, workshops &amp; wash bays</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p> <p><b>18.Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19.Opencast mining excavations</b></p>	<p><b>Degradation of soil resources</b></p>	<p>A soil conservation management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Specify mitigation measures that will be implemented to prevent contamination of topsoil's and fertile soils</li> <li>• Identify measures to be implemented preventing the loss of topsoil and fertile soils</li> <li>• Record keeping of available topsoil and fertile soil for use during the rehabilitation phase of an activity</li> <li>• Monitoring requirements</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of soil conservation management plan as or when required</p> <p>(2) Frequent quantification of available fertile soil for rehabilitation</p> <p>(3) Review of storm water management plan as or when required</p> <p>(4) Review of vehicle/plan/equipment maintenance plan as or when required</p> <p>(5) Daily inspections of vehicles/plant/equipment</p> <p>(6) Weekly inspections of spill prevention equipment</p>
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<p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>25. Waste generation, storage and disposal</b></p> <p><b>26. Chemical Toilets</b></p> <p><b>29. Storage of fuel and lubricants in temporary facilities</b></p> <p><b>33. Rehabilitation of mining areas</b></p> <p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining</b></p>				
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<p><b>areas</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>				
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<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>33. Rehabilitation of mining areas</b></p> <p><b>37. Rehabilitation of the lay</b></p>	<p><b>Vegetation and habitat loss</b></p>	<p>A plant search and rescue management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in the Biodiversity assessment attached as <b>Appendix L</b></li> <li>• Address requirements issued on the plant species permit obtained</li> <li>• Method of quantification and record keeping of search and rescued plants</li> <li>• Method of reinstating vegetation and ensuring rehabilitation objective is reached</li> </ul> <p>A soil conservation management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Specify mitigation measures that will be implemented to prevent contamination of topsoil's and fertile soils</li> <li>• Identify measures to be implemented preventing the loss of topsoil and fertile soils</li> <li>• Record keeping of available topsoil and fertile soil for use during the rehabilitation phase of an activity</li> <li>• Monitoring requirements</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of soil conservation management plan as or when required</p> <p>(2) Frequent quantification of available fertile soil for rehabilitation</p> <p>(3) Review of storm water management plan as or when required</p> <p>(4) Annual or frequency stipulated by the competent authority compliance auditing with the Mine Rehabilitation and closure plan</p> <p>(5) Annual rehabilitation plan as per GN R. 1142</p> <p>(6) Review of the Environmental Rehabilitation risk assessment as stipulated by the competent authority</p> <p>(7) Frequent quantification review</p>
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<p><b>down, stockpile and mining areas</b></p>		<p>Records to be kept of monitoring activities.</p>		<p>of search and rescued species  (8) Annual review or frequency as stipulated by the permit of plant removal permits</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b>  <b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b>  <b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b>  <b>9. Stores, workshops &amp; wash bays</b>  <b>11. Fuel operating power generators</b></p>	<p><b>Noise generation</b></p>	<p>A Noise monitoring programme to be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Frequency of monitoring</li> <li>• Method of monitoring</li> <li>• Compliance with the National Noise Control Regulations and SANS10103:2008 guidelines</li> <li>• Mitigation measures to prevent noise generation</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p> <p>Vehicles/plant/equipments must be inspected on a regular basis. Records of these inspections must be kept.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer (2) Project Management (3) Acoustical Consultant</p>	<p>(1) Monthly reporting on compliance with the Noise quality standards as per recommendations in <b>Appendix F</b>  (2) Review of vehicle/plan/equipment maintenance plan as or when required  (3) Frequent inspections of vehicles/plant/equipment</p>



<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>33. Rehabilitation of mining areas</b></p> <p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal</b></p>				
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<p><b>of mobile plant / equipment and vehicles</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>				
<p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Destruction of Wetlands</b></p>	<p>Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times.</p> <p>Compliance with the requirements must be monitored.</p> <p>A Water Management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Frequency of monitoring</li> <li>• Methods on addressing the requirements set out by the WUL</li> <li>• Compliance of water quality and monitoring of the constituents recommended in <b>Appendix G &amp; P</b></li> <li>• Description of mitigation measure to be implemented</li> <li>• Compliance with legal thresholds</li> <li>• Quantification of production related water balances</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of Water management plan as or when required</p> <p>(2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(3) Weekly inspections of diversion infrastructure</p> <p>(4) WUL audits as specified in licensing requirements</p>



		the EMPr, EA, and closure plan.  Records to be kept of monitoring activities.		
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>6. Storm water runoff management features</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>27. River crossings</b></p> <p><b>32. Water Management</b></p>	<p><b>Alteration of drainage patterns</b></p>	<p>Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times.</p> <p>Compliance with the requirements must be monitored.</p> <p>A Water Management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Frequency of monitoring</li> <li>• Methods on addressing the requirements set out by the WUL</li> <li>• Compliance of water quality and monitoring of the constituents recommended in <b>Appendix G &amp; P</b></li> <li>• Description of mitigation measure to be implemented</li> <li>• Compliance with legal thresholds</li> <li>• Quantification of production related water balances</li> </ul> <p>A Storm water management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in the storm water management plan in <b>Appendix D</b></li> <li>• Requirements to monitor the functionality of storm water infrastructure</li> </ul>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of storm water management plan as or when required</p> <p>(2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(3) Frequent inspections of diversion infrastructure</p> <p>(4) WUL audits as specified in licensing requirements</p>



		<ul style="list-style-type: none"> <li>• Frequency of monitoring</li> <li>• Dirty water containment methods and frequent quantification and control of volumes</li> <li>• Water quality monitoring requirements</li> <li>• Methods addressing requirements set out in the WUL</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>		
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>32. Water Management</b></p>	<p><b>Destruction of upstream tributaries and reduction in water in the catchment</b></p>	<p>Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times.</p> <p>Compliance with the requirements must be monitored.</p> <p>A Water Management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Frequency of monitoring</li> <li>• Methods on addressing the requirements set out by the WUL</li> <li>• Compliance of water quality and monitoring of the constituents recommended in <b>Appendix G &amp; P</b></li> <li>• Description of mitigation measure to be implemented</li> <li>• Compliance with legal thresholds</li> <li>• Quantification of production related water balances</li> </ul>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of storm water management plan as or when required</p> <p>(2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(3) Frequent inspections of diversion infrastructure</p> <p>(4) WUL audits as specified in licensing requirements</p>



		<p>A Storm water management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in the storm water management plan in <b>Appendix D</b></li> <li>• Requirements to monitor the functionality of storm water infrastructure</li> <li>• Frequency of monitoring</li> <li>• Dirty water containment methods and frequent quantification and control of volumes</li> <li>• Water quality monitoring requirements</li> <li>• Methods addressing requirements set out in the WUL</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>		
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Sedimentation and siltation of watercourses</b></p>	<p>Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times.</p> <p>Compliance with the requirements must be monitored.</p> <p>A Water Management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Frequency of monitoring</li> </ul>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Review of storm water management plan as or when required</p> <p>(2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in</p>





<p><b>6. Storm water runoff management features</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>33. Rehabilitation of mining areas</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining</b></p>		<ul style="list-style-type: none"> <li>• Methods on addressing the requirements set out by the WUL</li> <li>• Compliance of water quality and monitoring of the constituents recommended in <b>Appendix G &amp; P</b></li> <li>• Description of mitigation measure to be implemented</li> <li>• Compliance with legal thresholds</li> <li>• Quantification of production related water balances</li> </ul> <p>A Storm water management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in the storm water management plan in <b>Appendix D</b></li> <li>• Requirements to monitor the functionality of storm water infrastructure</li> <li>• Frequency of monitoring</li> <li>• Dirty water containment methods and frequent quantification and control of volumes</li> <li>• Water quality monitoring requirements</li> <li>• Methods addressing requirements set out in the WUL</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>		<p><b>Appendix G &amp; P</b></p> <p>(3) Frequent inspections of diversion infrastructure</p> <p>(4) WUL audits as specified in licensing requirements</p>
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areas				
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p>	<p><b>Water usage for dust suppression</b></p>	<p>Monitor and record water usage for dust suppression.</p> <p>Promoting the re-use of water contained as specified in the Storm water Management plan is recommended. However the water quality must be tested to ensure legal compliance before re-use.</p> <p>The operational water balances must be monitored and reviewed on a frequent basis as to ensure compliance with the WUL requirements.</p> <p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer            (2) Project Management</p>	<p>(1) Frequent reporting on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(2) Daily recoding of water usage for dust suppression</p> <p>(3) Frequent review of operational water balances</p> <p>(4) WUL audits as specified in licensing requirements</p>
<p><b>4. Onsite Clinic</b>   <b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p>	<p><b>Domestic water usage</b></p>	<p>Monitor and record water usage for dust suppression.</p> <p>Promoting the re-use of water contained as specified in the Storm water Management plan is recommended. However the water quality must be tested to ensure legal compliance before re-use.</p> <p>The operational water balances must be monitored and reviewed on a frequent basis as to ensure compliance with the WUL requirements.</p> <p>Listed activities must be monitored frequently to ensure compliance with</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer            (2) Project Management</p>	<p>(1) Frequent reporting on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(2) Daily recoding of water usage for dust suppression</p> <p>(3) Frequent review of operational water balances</p>



		<p>the EMPr, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>		(4) WUL audits as specified in licensing requirements
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p>	<b>Influx of alien invasive vegetation</b>	<p>An alien eradication and control management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identification of areas prone to alien species in accordance with the applicable regulations and <b>Appendix L</b></li> <li>• Reference to recommendations made in <b>Appendix L</b></li> <li>• Frequency of monitoring and inspection requirements of areas prone to establishment</li> <li>• Eradication methods</li> <li>• Including requirements stipulated in the legal requirements stipulated in Table 16</li> </ul> <p>Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p> <p>(3) Herbicide consultant</p>	<p>(1) Review of alien eradication and control management plan as or when required</p> <p>(2) Weekly inspection of site for the visible signs of alien species establishment</p>



<p><b>33. Rehabilitation of mining areas</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p>				
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>9.Stores, workshops &amp; wash bays</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p> <p><b>18.Topsoil and subsoil</b></p>	<p><b>CO<sub>2</sub> emissions &amp; Release of noxious gasses</b></p>	<p>Frequent monitoring and reporting of the Spitsvale Mine carbon footprint.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer          (2) Project Management</p>	<p>(1) Frequent reporting of the Spitsvale Carbon footprint status</p>



<p><b>stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>23. Screening Operations</b></p> <p><b>28. Water supply (potable &amp; process)</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>31. Bulk transporting of Ore to market on Public roads</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p>				
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining</b></p>	<p><b>Topography and visual alteration</b></p>	<p>Monitoring Compliance with the requirements set out by GN R. 1142.</p> <p>Records to be kept of pre-construction topography. Alteration to be monitored and managed in accordance with the rehabilitation objectives.</p>	<p>(1) Environmental Control Officer/Environment</p>	<p>(1) Annual compliance auditing or frequency stipulated by the competent authority with the</p>



<p><b>infrastructure</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p>		<p>Listed activities must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>al Officer/ SHEQ Officer          (2) Project Management</p>	<p>Mine Rehabilitation and closure plan</p> <p>(2) Review of the Annual rehabilitation plan as stipulated by GN R. 1142</p> <p>(3) Annual review of the Environmental Rehabilitation risk assessment</p> <p>(4) Frequent inspection of mining areas</p>
<p><b>1. Access and hauling along roads i.e. during the construction of roads</b></p> <p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p>	<p><b>Erosion</b></p>	<p>A Storm water management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in the conceptual storm water management plan in <b>Appendix L</b></li> <li>• Requirements to monitor the functionality of storm water infrastructure</li> <li>• Frequency of monitoring</li> <li>• Dirty water containment methods and frequent quantification</li> </ul>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer          (2) Project Management</p>	<p>(1) Review of soil conservation management plan as or when required</p> <p>(2) Frequent quantification of available fertile soil for rehabilitation</p> <p>(3) Review of storm water management plan as or when</p>



<p><b>6. Storm water runoff management features</b></p> <p><b>15. Transport of construction material, mobile plant and equipment to the site</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>27. River crossings</b></p> <p><b>30. Vehicular activity on haul roads; and operation of mining equipment</b></p> <p><b>32. Water Management</b></p> <p><b>33. Rehabilitation of mining</b></p>		<p>and control of volumes</p> <ul style="list-style-type: none"> <li>• Water quality monitoring requirements</li> <li>• Methods addressing requirements set out in the WUL</li> </ul> <p>A soil conservation management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Specify mitigation measures that will be implemented to prevent contamination of topsoil's and fertile soils</li> <li>• Identify measures to be implemented preventing the loss of topsoil and fertile soils</li> <li>• Record keeping of available topsoil and fertile soil for use during the rehabilitation phase of an activity</li> <li>• Monitoring requirements</li> </ul> <p>Areas prone to erosion must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>required</p> <p>(4) Annual compliance auditing or frequency stipulated by the competent authority with the Mine Rehabilitation and closure plan</p> <p>(5) Annual rehabilitation plan as required by GN R.1142</p> <p>(6) Annual review of the Environmental Rehabilitation risk assessment as required by GN R.1142</p>
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<p><b>areas</b></p> <p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>36. Vehicular activity: removal of mobile plant / equipment and vehicles</b></p> <p><b>37. Rehabilitation of the lay down, stockpile and mining areas</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>				
<p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p> <p><b>9. Stores, workshops &amp; wash bays</b></p>	<p><b>Contamination of water resources</b></p>	<p>Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times.</p> <p>Compliance with the requirements must be monitored.</p> <p>A Water Management plan must be developed and address at least the</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project</p>	<p>(1) Auditing of IWWMP according to the specified time frames stipulated in the WUL</p> <p>(2) Review of IWWMP according to the specified time frames</p>





<p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p> <p><b>11. Fuel operating power generators</b></p> <p><b>13. Fuel storage</b></p> <p><b>19. Opencast mining excavations</b></p> <p><b>20. Drilling &amp; Blasting</b></p> <p><b>21. RoM &amp; product stockpiling</b></p> <p><b>22. Residue stockpiles</b></p> <p><b>23. Screening Operations</b></p> <p><b>24. Discard disposal (backfilling of mining area)</b></p> <p><b>25. Waste generation, storage and disposal</b></p> <p><b>26. Chemical Toilets</b></p> <p><b>27. River crossings</b></p>		<p>following:</p> <ul style="list-style-type: none"> <li>• Frequency of monitoring</li> <li>• Methods on addressing the requirements set out by the WUL</li> <li>• Compliance of water quality and monitoring of the constituents recommended in <b>Appendix G &amp; P</b></li> <li>• Description of mitigation measure to be implemented</li> <li>• Compliance with legal thresholds</li> <li>• Quantification of production related water balances</li> </ul> <p>A Storm water management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in the storm water management plan in <b>Appendix D</b></li> <li>• Requirements to monitor the functionality of storm water infrastructure</li> <li>• Frequency of monitoring</li> <li>• Dirty water containment methods and frequent quantification and control of volumes</li> <li>• Water quality monitoring requirements</li> <li>• Methods addressing requirements set out in the WUL</li> </ul> <p>The compliance of the IWWMP approved by the Department of Water Affairs must be monitored as frequently as indicated by the WUL.</p> <p>Listed activities must be monitored frequently to ensure compliance with</p>	<p>Management</p>	<p>stipulated in the WUL</p> <p>(3) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(4) Review of the water management plan as or when required</p> <p>(5) Daily recoding of water usage</p> <p>(6) Frequent review of operational water balances</p> <p>(7) WUL audits as specified in licensing requirements</p> <p>(8) Review of storm water management plan as or when required</p> <p>(9) Annual review of the Emergency preparedness and response plan or review after occurrence of emergency</p>
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<p><b>28. Water supply (potable &amp; process)</b></p> <p><b>29. Storage of fuel and lubricants in temporary facilities</b></p> <p><b>32. Water Management</b></p> <p><b>38. Demolition of Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>		<p>the EMPr, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>		<p>incident</p> <p>(10) Weekly inspections of spill prevention equipment</p>
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Destruction of graves</b></p>	<p>Sites identified by <b>Appendix R</b> must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p> <p>(3) Suitable accredited and qualified</p>	<p>(1) Frequent inspections of marked graves to ensure no disturbance</p>



			archaeologist	
<p><b>2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure</b></p> <p><b>18. Topsoil and subsoil stripping &amp; stockpiling for mining operation area</b></p>	<p><b>Degradation of cultural significance heritage sites</b></p>	<p>Sites identified by <b>Appendix R</b> must be monitored frequently to ensure compliance with the EMP, EA, and closure plan.</p> <p>Records to be kept of monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p> <p>(3) Suitable accredited and qualified archaeologist</p>	<p>(1) Frequent inspections of marked heritage sites to ensure no disturbance</p>
<p><b>4. Onsite Clinic</b></p> <p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>12. Lighting</b></p>	<p><b>Electricity usage</b></p>	<p>Frequent monitoring and reporting on the use of electricity.</p> <p>Frequent monitoring and reporting of the Spitsvale Mine carbon footprint.</p> <p>Records to be kept of such monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Frequent reporting of electricity usage</p> <p>(2) Frequent reporting of the Spitsvale Carbon footprint status</p>
<p><b>4. Onsite Clinic</b></p>	<p><b>Medical Waste</b></p>	<p>A Waste management plan must be developed and address at least the following:</p>	<p>(1) Health and safety officer</p>	<p>(1) Review of the Spitsvale Mine Health and Safety management</p>



	<p><b>generation</b></p>	<ul style="list-style-type: none"> <li>• Identification of possible waste streams both hazardous and general</li> <li>• Description of method to re-use, reduce, recycle, or avoid waste generation</li> <li>• Monitoring requirements</li> <li>• Quantification of waste streams</li> <li>• Description of mitigation measures</li> <li>• Compliance with regulations stipulated in Table 16</li> </ul> <p>The Spitsvale Health and safety management plan must at least include the following specific environmental related requirements:</p> <ul style="list-style-type: none"> <li>• Management of medical waste</li> <li>• Management of hazardous substances</li> </ul> <p>On-going monitoring and recording of medical waste generation.</p>	<p>(2) Project Management          (3) All trained first aid staff</p>	<p>plan as or when required</p> <p>(2) Review of the on-site Clinic management plan as or when required</p> <p>(3) Frequent inspection of medical waste facilities</p> <p>(4) Monthly reporting of medical waste generation</p>
<p><b>5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities</b></p> <p><b>35. Demolition / removal of portable and related infrastructure</b></p> <p><b>38. Demolition of</b></p>	<p><b>General waste generation &amp; Littering</b></p>	<p>A Waste management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identification of possible waste streams both hazardous and general</li> <li>• Description of method to re-use, reduce, recycle, or avoid waste generation</li> <li>• Monitoring requirements</li> <li>• Quantification of waste streams</li> <li>• Description of mitigation measures</li> <li>• Compliance with regulations stipulated in Table 16</li> </ul>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer          (2) Project Management</p>	<p>(1)Frequent inspection of on-site waste disposal facilities and sites</p> <p>(2) Review of the Spitsvale Waste Management plan as or when required</p>



<p><b>Sedimentation Ponds</b></p> <p><b>39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.</b></p>		<p>On-going monitoring, Report and record of all waste streams are required.</p> <p>Frequent inspections of waste disposal facilities or areas to take place.</p> <p>Records to be kept of such monitoring activities.</p>		
<p><b>22. Residue stockpiles</b></p> <p><b>25. Waste generation, storage and disposal</b></p>	<p><b>Hazardous Leachate</b></p>	<p>A Waste management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identification of possible waste streams both hazardous and general</li> <li>• Description of method to re-use, reduce, recycle, or avoid waste generation</li> <li>• Monitoring requirements</li> <li>• Quantification of waste streams</li> <li>• Description of mitigation measures</li> <li>• Compliance with regulations stipulated in Table 16</li> </ul> <p>On-going monitoring, Report and record of all waste streams are required.</p> <p>Monitoring, auditing, and reporting of compliance with the Waste Management Licence will be required as specified in the authorisation.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1)Frequent inspection of on-site waste disposal facilities and sites</p> <p>(2) Review of the Spitsvale Waste Management plan as or when required</p> <p>(3) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(4) Frequent inspection of waste disposal facilities</p> <p>(5) Compliance audit with the WML as specified by the competent authority</p>



<p><b>25. Waste generation, storage and disposal</b></p>	<p><b>Illegal dumping</b></p>	<p>A Waste management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identification of possible waste streams both hazardous and general</li> <li>• Description of method to re-use, reduce, recycle, or avoid waste generation</li> <li>• Monitoring requirements</li> <li>• Quantification of waste streams</li> <li>• Description of mitigation measures</li> <li>• Compliance with regulations stipulated in Table 16</li> </ul> <p>On-going monitoring, Report and record of all waste streams are required.</p> <p>Frequent inspections of waste disposal facilities or areas to take place. Records to be kept of such monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer          (2) Project Management</p>	<p>(1)Frequent inspection of on-site waste disposal facilities and sites          (2) Review of the Spitsvale Waste Management plan as or when required</p>
<p><b>7. Water storage facilities</b>   <b>28. Water supply (potable &amp; process)</b>   <b>32. Water Management</b></p>	<p><b>Improper water storage management</b></p>	<p>Monitor and record water usage for dust suppression.</p> <p>Promoting the re-use of water contained as specified in the Storm water Management plan is recommended. However the water quality must be tested to ensure legal compliance before re-use.</p> <p>The operational water balances must be monitored and reviewed on a frequent basis as to ensure compliance with the WUL requirements.</p> <p>Listed activities must be monitored frequently to ensure compliance with</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer          (2) Project Management</p>	<p>(1) Frequent reporting on the compliance of water quality results as specified in <b>Appendix G &amp; P</b>          (2) Daily recoding of water usage for dust suppression          (3) Frequent review of</p>



		<p>the EMP, EA, and closure plan.</p> <p>Frequent inspection of water storage facilities is required.</p> <p>Records to be kept of monitoring activities.</p>		<p>operational water balances</p> <p>(4) WUL audits as specified in licensing requirements</p>
<p><b>8. Sedimentation Ponds (pollution containment ponds) i.e. Construction and operation</b></p> <p><b>10. Ablutions &amp; change house with sewage treatment plant</b></p> <p><b>26. Chemical Toilets</b></p>	<b>Smell nuisance</b>	<p>A Waste management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identification of possible waste streams both hazardous and general – include the management of effluent</li> <li>• Description of method to re-use, reduce, recycle, or avoid waste generation</li> <li>• Monitoring requirements</li> <li>• Quantification of waste streams</li> <li>• Description of mitigation measures</li> <li>• Compliance with regulations stipulated in Table 16</li> </ul> <p>Frequent inspection of sewage and chemical toilet facilities is required.</p> <p>Records to be kept of monitoring activities.</p>	<p>(1) Environmental Control Officer/Environmental Officer/ SHEQ Officer</p> <p>(2) Project Management</p>	<p>(1) Frequent reporting on the compliance of water quality results as specified in <b>Appendix G &amp; P</b></p> <p>(2) Review of the Spitsvale Waste Management plan as or when required</p> <p>(3) Frequent inspections of infrastructure associated abluion, sewage, and chemical toilet facilities</p>
<p><b>9.Stores, workshops &amp;wash bays</b></p> <p><b>11. Fuel operating power generators</b></p>	<b>Chemical Fires</b>	<p>A hazardous substance management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Storage, transport, handling, and disposal requirements according to the legislative requirements listed in Table 16</li> <li>• Fire prevention methods including the description of equipment</li> </ul>	<p>(1) Health and safety officer</p> <p>(2) Site management</p>	<p>(1) Review of fire prevention plan as or when required</p> <p>(2) Frequent inspections of fire prevention equipment</p>



<p><b>13. Fuel storage</b></p> <p><b>29. Storage of fuel and lubricants in temporary facilities</b></p>		<p>to be available for emergency situations</p> <ul style="list-style-type: none"> <li>• Health and safety requirements</li> <li>• Monitoring requirements</li> </ul> <p>A fire prevention plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identification of all fire risks associated to the Spitsvale Mine</li> <li>• Describe preventative measures and include equipment</li> <li>• Monitoring of fire prevention equipment and high risk areas</li> </ul> <p>A Emergency preparedness and response plan to be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identifying possible emergency situations – include Chemical fires</li> <li>• Describe preventative measures</li> <li>• Describe procedure to be followed in the case of a emergency</li> <li>• Include emergency contact details</li> <li>• Include monitoring requirements of preventative measures and or equipment</li> <li>• Appoint responsible persons</li> </ul> <p>Frequent inspection of hazardous substances storage facilities is required.</p> <p>Records to be kept of monitoring activities.</p>	<p>(3) Annual review of the Emergency preparedness and response plan or review after occurrence of emergency incident</p> <p>(4) Frequent inspections of hazardous substances storage facilities</p> <p>(5) Review of Hazardous substances management plan as or when required</p> <p>(6) Frequent inspections of spill prevention equipment</p>
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<p><b>12. Lighting</b></p>	<p><b>Light pollution</b></p>	<p>Monitoring of the effects posed by light pollution.</p>	<p>(1) Project management          (2) Environmental Control Officer/Environmental Officer/SHEQ Manager</p>	<p>(1) Biennial investigation and reporting</p>
<p><b>13. Fuel storage</b></p>	<p><b>Emission of noxious fumes</b></p>	<p>A hazardous substance management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Storage, transport, handling, and disposal requirements according to the legislative requirements listed in Table 16</li> <li>• Fire prevention methods including the description of equipment to be available for emergency situations</li> <li>• Health and safety requirements</li> <li>• Monitoring requirements</li> </ul> <p>A Emergency preparedness and response plan to be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Identifying possible emergency situations – include Chemical fires</li> <li>• Describe preventative measures</li> <li>• Describe procedure to be followed in the case of a emergency</li> <li>• Include emergency contact details</li> <li>• Include monitoring requirements of preventative measures and</li> </ul>	<p>(1) Health and safety officer          (2) Site management</p>	<p>(1) Annual review of the Emergency preparedness and response plan or review after occurrence of emergency incident</p> <p>(2) Frequent inspections of hazardous substances storage facilities</p> <p>(3) Review of Hazardous substances management plan as or when required</p> <p>(4) Frequent inspections of spill prevention equipment</p>



		<p>or equipment</p> <ul style="list-style-type: none"> <li>• Appoint responsible persons</li> </ul> <p>Frequent inspection of fuel storage facilities is required.</p> <p>Records to be kept of monitoring activities.</p>		
<p><b>14. Employment of workers and procurement of construction materials.</b></p> <p><b>17. Employment of workers</b></p>	<b>Loss of farm labour</b>	Frequent monitoring of compliance with the Social Labour plan.	<p>(1) Company Directors</p> <p>(2) Human Resource manager</p> <p>(3) Project manager</p> <p>(4) SHEQ/ Health and Safety Manger</p>	<p>(1) Review of Social Labour plan as required by legislation and the competent authority</p> <p>(2) Review of grievance procedure as or when required</p> <p>(3) Ongoing recording of complaints received by I&amp;AP</p> <p>(4) Review of Spitsvale Health and Safety management plan as or when required</p>
	<b>Population Influx – Pressure on Resources</b>	<p>A grievance procedure to be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Procedure for recoding and addressing all complaints received by mine employees, contractors, or sub-contractors and surrounding I&amp;AP.</li> </ul>		
	<b>Population Influx – Social Pathologies</b>	The Spitsvale Health and safety management plan must at least include the following specific environmental related requirements:		
	<b>Population Influx – Community Conflict</b>	<ul style="list-style-type: none"> <li>• Considers recommendations in <b>Appendix Q</b></li> </ul>		
	<b>Health and Safety of employees</b>	Records to be kept of monitoring activities.		
	<b>Job Creation and Skills Training</b>			



	<b>Job Creation (Multiplier affect) and Population Influx</b>			
<b>20. Drilling &amp; Blasting</b>	<b>Damage to surrounding landowner properties</b>	<p>A drilling and blasting management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Methods used for drilling and blasting</li> <li>• Safety requirements including</li> <li>• Monitoring requirements</li> <li>• Assessment of possible risks through a risk assessment</li> </ul> <p>Records to be kept of monitoring activities.</p>	<p>(1) Blasting supervisor/officer.            (2) Blasting engineer.            (3) Project management            (4) Health and safety manager/officer.</p>	<p>(1) Review of drilling and blasting management plan as or when required            (2) Frequent monitoring of areas affected by blasting activities</p>
<b>31. Bulk transporting of Ore to market on Public roads</b>	<b>Pressure on public transport infrastructure</b>	<p>A traffic management plan must be developed and address at least the following:</p> <ul style="list-style-type: none"> <li>• Recommendations made in <b>Appendix S</b></li> <li>• Monitoring requirements</li> <li>• Legal requirements</li> </ul> <p>Records to be kept of monitoring activities.</p>	<p>(1) Health and Safety Manager/Officer.            (2) Project management.</p>	<p>(1) Review of traffic management plan as or when required            (2) Frequent monitoring of traffic related issues</p>



**(I) Indicate the frequency of the submission of the performance assessment report**

In GN.R. 926 (National Norms and Standards for the storage of waste) it is required that an internal audit be conducted on a bi-annually (twice a year) basis. Findings and recommendations must be implemented and proof of close-out is to be recorded.

An independent external auditor must be appointed to audit the waste storage facility biennially (once every two years) and the auditor must compile an audit report documenting the findings. The final document is to be submitted to the relevant authority;

The audit report must:

- Specify the facilities level of compliance and whether conditions of the NEMWA regulations are adhered to;
- Include an interpretation of all available data and test results regarding the operation of the storage facility and all its impacts on the environment;
- Specify target dates for the implement the recommendations to achieve compliance;
- Contain recommendations regarding non-compliance or potential non-compliance and must specify target dates for the implement the recommendations and whether corrective action taken for previous audit non conformities was adequate; and
- Show monitoring results graphically and conduct trend analysis.

In addition section 34 of GN R. 982 (published under the National Environmental Management Act (NEMA), Act 107 of 1998) stipulates requirements for auditing compliance with the Environmental Authorisation (EA), the Final EMPr, and the Rehabilitation plan.

It requires the holder of the authorisation, for the period during which the EA, EMPr, and closure plan (if applicable) are valid, to ensure compliance with all the conditions stipulated in these documents and that is be audited. This audit report must then be submitted to the competent authority.

This audit report must adhere to the following conditions:

- Be prepared by an independent person with the relevant environmental auditing expertise;
- Provide verifiable findings, in a structured and systematic manner, on:
  - the level of performance against and compliance of an organization or project with the provisions of the requisite environmental authorisation or EMPr and, where applicable, the closure plan; and
  - the ability of the measures contained in the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;



- Contain the information set out in Appendix 7 of GN R. 982; and
- Be conducted and submitted to the competent authority at intervals as indicated in the environmental authorisation.

The purpose of this audit report is defined as follows:

- On an ongoing basis, determine the ability of the EMPr (and where applicable the closure plan) to sufficiently provide for:
  - the avoidance;
  - management; and
  - mitigation of environmental impacts; and
- To determine the level of compliance with the provisions of:
  - Environmental Authorisation (EA);
  - EMPr; and
  - where applicable the closure plan.

In the event that findings of the environmental audit report indicate insufficient mitigation of environmental impacts of the activity or insufficient levels of compliance with the requirements, the holder of the EA must:

- Submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the audit report.
- Allow for a public participation process (which process has been agreed to by the competent authority and was appropriate) to access the proposed amendment to the EMPr (of which the Final WMP forms part of and, where applicable the closure plan); and
- Allow for the potential and registered interested and affected parties (I&AP), including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, to comment on these changes.

Within 7 days of the date of submission of an environmental audit report to the competent authority, the holder of an environmental authorisation must:

- Notify all potential and registered interested and affected parties of the submission of that report, and make such report immediately available:
  - ✓ to anyone on request; and
  - ✓ on a publicly accessible website, where the holder has such a website.
- The environmental audit report must contain all information set out in Appendix 7 of GN R. 982.



This **independent audit** is to take place on a biennial (once every two years) basis or as specified by the competent authority in the EA, to promote continual improvement at the Spitsvale Mine.

In terms of the definition of the regulations (GN R. 982), **independent** in relation to the person responsible for the preparation of an environmental audit report, means:

- That such person has no business, financial, personal, or other interest in the activity and is appointed in terms of the regulations; or
- That there are no circumstances that may compromise the objectivity of the person performing such work excluding fair remuneration for work performed in connection with the environmental audit report.

Compliance monitoring to be carried out as recommended in Table 19.

#### **(m) Environmental Awareness Plan**

General environmental awareness must be promoted among everyone working on the Spitsvale Mine (including consultants and contractors) to encourage the implement environmentally sound practices throughout its duration.

This will ensure that environmental incidents are minimised and environmental compliance maximised.

The purpose of an Environmental Awareness Plan is as follows:

- To outline the method used to inform employees of any environmental risks which may result from their work;
- The manner in which the risks must be dealt with in order to avoid contamination or the degradation of the environment.
- Serves as a tool to introduce and describe the requirements set out in the Final EMPr, EA (Environmental Authorisation), and Waste Management Plan (WMP); and
- Ensures that training needs are identified and appropriate training is provided.

The environmental awareness plan must at least communicate the following:

- Importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of an individual's work activities and the environmental benefits of improved performance;
- Individual's roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.



**(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work**

In order for the environmental awareness policy to be effective, the issues raised through it need to be communicated through training sessions, meetings, consultations and progress reviews. The following are recommended minimum steps that can be taken to ensure communication is effective:

- The agendas of all company board meetings will have an item where issues environmental Projects are discussed and feedback is given;
- Provide progress Reports on the achievement of policy objectives and level of compliance with the approved EMPr and the closure plan complying with GN R. 1147, to the DMR on request;
- Ensure environmental issues are realised at monthly mine management executive committee meetings and at all relevant, mine wide meetings, at all levels; and
- Ensure environmental issues are discussed at all general liaison meetings with local communities and other I&APs.

**Site Inductions**

All employees are required to undergo environmental awareness induction training on appointment. All records of such training must be kept. Refresher induction training must periodically take place.

**Toolbox talks**

Regular meetings (recommended to be done daily, at least once a week) communicating the following is recommended:

- Findings of environmental performance reports;
- Awareness raising campaigns discussing environmental topics; and
- Information of any environmental risk which may result from employee's work.

**Specialised Waste Management training**

All supervisory and management staff is to be trained by a suitably qualified institution on the requirements stipulated in NEMWA and its regulations.

This training must inform staff of the following procedures and requirements:

- Detailed requirements of NEMWA and regulations;
- Legislative requirements associated to the manage hazardous waste;
- Legislative requirements for the storage, transport, and disposal of waste.



## **Communicates**

Regular meetings (recommended to be done daily, at least once a week) communicating the following is recommended:

- Findings of environmental performance reports;
- Awareness raising campaigns discussing environmental topics; and
- Information of any environmental risk which may result from employee's work.

### **(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment**

It is recommended that an awareness training schedule be developed. This schedule must at least indicate the following:

- Topic;
- Method of communicating i.e. through a workshop, training session, or meeting;
- Target group i.e. management, skilled or semi skilled labour, admin staff etc;
- Scheduled time; and
- Progress.

The following topics are recommended:

- Potential environmental risks associated to the management of waste types;
- Requirements stipulated by the EA once received;
- Legal requirements, including the following examples:
  - Requirements stipulated in WMP;
  - Classification of waste;
  - Transportation of waste;
  - Storing of waste; and
  - Waste handling.
- EMS (Environmental Management System) requirements;
- Environmental performance; and
- Environmental incidents addressing corrective and preventative measures to be implemented.

### **(n) Specific information required by the Competent Authority**

*(Among others, confirm that the financial provision will be reviewed annually)*

The preparation of the Spitsvale Mine Rehabilitation, closure and liability plan in accordance with GN R. 1142 has been completed (**Appendix U**).

A WULA process is underway.





## 2) UNDERTAKING

The EAP herewith confirms

- a. the correctness of the report accompanied by this declaration;
- b. the inclusion of comments and inputs from stakeholders and I&AP's;
- 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.

### UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, **Anandi Alers**, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

\_\_\_\_\_  
Signature of the EAP

DATE:

### UNDERTAKING REGARDING LEVEL OF AGREEMENT

I, **Anandi Alers**, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

\_\_\_\_\_  
Signature of the EAP

DATE:

**-END-**