

ENVIRONMENTAL IMPACT ASSESSMENT REPORT And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE CHROME ORE MINING RIGHT APPLICATION AND ASSOCIATED LISTED ACTIVITIES

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).

NAME OF APPLICANT: BCR Minerals PTY (LTD)

TEL NO: +27 (0)11 467 5793 **FAX NO:** +27 (0)86 236 7206

POSTAL ADDRESS: Postnet Suite 911, Private Bag x153, Bryanston, 2021

PHYSICAL ADDRESS: Unit 7, Stratfort Office Park, c/o Cedar & Valley Road, Broad Acres, Fourways, 2196

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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) is proposing an opencast chrome mining development, hereafter be referred to the Spitsvale Project, 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, near the town of Steelpoort (South West), Limpopo.

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) and the Mineral and Petroleum Resources Development Act, 2002 (Act no. 28 of 2002).

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 Kennedy's Vale 361 KT are registered in the name of Rhodium Reefs, which are a subsidiary of Eastern Platinum Limited and the relevant portions of the farm Spitskop 333 KT is 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 the mineral chromite 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. Mining will be undertaken by open cut methods (drilling, blasting, and excavating ore material) where after the raw sorted ore be transported in bulk to various markets.

The scope of work requires investigating all potential environmental and social impacts, for various activities, in terms of GN R. 982 of the National Environmental Management Act, Act 107 of 1998 (NEMA); and compiling a required Environmental Impact Assessment Report (EIR) (Part A) and an Environmental Management Programme Report (EMPR)(Part B) in support of the Mining Permit, in terms of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA).

These two part document includes all specialist studies required to identify the potential environmental impacts of the Project and its related activities. This document will be submitted to the Limpopo DMR in support of BCR Minerals (Pty) Ltd Spitsvale Project Mining Permit Application (MPA).

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 Project environmental and socio-economic context;



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- Develop a detailed understanding of the baseline environment at the sites proposed for development;
- 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 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

No alternatives have been considered for this Project.

A number of specialist investigations were carried out as part of compiling this report. 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 should be considered:

- The location of the proposed mining development is situated within and in close proximity to the Sekhukhune centre of endemism. Therefore conservation of the surrounding terrestrial biodiversity should 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 will be restored.
- 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.

It is clear from the assessment results highlighted in this report 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 Project, the impacts can be mitigated to a **medium/low negative significant** impact or avoided all together.



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A number of recommendations are made to be included in the Environmental Authorisation. These recommendations include, but are not limited to, the following:

- All comments and concerns raised by the registered I&AP be considered and incorporated into the final EIR and EMPr;
- The Spitsvale Mine Rehabilitation, Closure and Liability plan attached as **Appendix S** 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;
- A final site layout detailing all infrastructure (with specific reference to the storm water management infrastructure, the PCD's designs, and the river crossings) associated to current and future mining activities must be provided to the competent authorities for approval before any activities commence;
- Conditions stipulated in the final EMPr and closure plan be adhered with;
- Conditions stipulated in all other permits or authorisations should be implemented; and
- All recommendations made in the EIR and specialist studies be implemented and considered in the finalisation
 of the site lay out plan and operational design of the proposed mining development.

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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 among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

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

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

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

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

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2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is 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.

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PART A: SCOPE OF ASSSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and correspondence address

Environmental Management Assistance (Pty) Ltd has been requested to complete the EIA and EMPr process associated to the application for a mining right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) to the Limpopo Department of Minerals and Resources on behalf of BCR Minerals (Pty) Ltd (applicant) for the Spitsvale Chrome Mine situated in the Greater Tubatse Municipality, Limpopo. In addition to the application for a mining right the applicant have also applied for associated activities as listed in Listing notice 1, 2, and 3 of the 2014 EIA regulations (GG38282 GNR 982 of 2014).

a) Details of

Details of the EAP

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

ii) Expertise of the EAP

Environmental Management Assistance (Pty) Ltd (EMA) has appointed Mrs. Anandi Alers (Trainee Certified 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 have 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)



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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 EMPr's and EA (Environmental Authorisations);
- The development and management of a ISO 14001 EMS (Environmental Management Systems) on a number of construction related projects;
- Development and implementation of 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

Farm Name:	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	
Application area (Ha) :	±2 181	
Magisterial district:	Greater Tubatse District Municipality	
Distance and direction from nearest town:	±15 km South West from Steelpoort, Limpopo	
21 digit Surveyor General Code for each	T0KT0000000033300024, T0KT0000000033300025,	
farm portion:	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 infrastructures to be placed on the associated properties can be found in **Appendix C**.

At the time of submitting this report to the competent authority the following infrastructures did not form part of the site layout:



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- Storm water infrastructure;
- Location of PCD's; and
- Detailed infrastructure associated to the Tubatse lay down area.

It is therefore recommended that before authorising the activity a detailed site layout plan be submitted indicating the details of all infrastructure associated to the proposed mining development.

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, resulting in this report. These activities are highlighted in Table 1 below.

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

NAME OF ACTIVITY (All	Aerial extent of the Activity	LISTED	APPLICABLE LISTING NOTICE
activities including activities not	Ha or m²	ACTIVITY	(GNR 544, GNR 545 or GNR 546)/NOT
listed) (E.g. Excavations,		Mark with an X where	LISTED
blasting, stockpiles, discard		applicable or affected.	
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,			
etcetc)	N.C.		ONDOO A 11 11 00 0 00
All infrastructure areas,	Mineral boundary:		GNR983 - Activities 22 & 28
development footprints	2144,3125 ha	Χ	GNR984 - Activities 6, 15, 17 and
and associated activities.	Proposed activity area:	χ	21
	1250 ha		GNR985 - Activities 12 and 14
Opencast excavations	Maximum at any one		GNR983 - Activities 22 & 28
	time:50ha		GNR984 - Activities 6, 15, 17 and
	Total proposed area to be	X	21
	affected on completion of	^	GNR985 - Activities 12 and 14
	mining: 355 ha		
Topsoil & subsoil stripping	25ha	X	GNR984 - Activity 15



& stockpiling		GNR985 - Activity 12
Residue stockpiles	45ha	GNR984 - Activities 6 & 15
r toolade etechpiioe	Tona	GNR985 - Activity 12
		GNR 633 - Activity 11
Blasting	N/A	Not listed
RoM & product	19ha	GNR984 - Activity 6
stockpiling		GNR985 - Activity 12
Access and hauling along	760m of roads will be	GNR983 - Activity 24
roads	upgraded	GNR985 - Activities 4, 14 and 18
	2 800m of road will be	
	constructed	
Screening plant	20ha	GNR984 - Activities 6, 15, and 21
Water supply (potable &	<1ha	GNR983 - Activity 9
process)		GNR985 - Activity 14
Water storage (reservoirs		GNR983 - Activity 13
/ tanks)		GNR984 - Activity 6
		GNR985 - Activity 2
Discard disposal	N/A	GNR983 - Activity 22
(backfilling)		GNR984 - Activity 6
Storm water runoff		GNR983 - Activity 9
management features		GNR984 - Activity 6
		GNR985 - Activity 14
Waste generation &	<1ha	Expected waste generation under
storage		threshold
Stores, workshops &wash	<11ha	Not listed
bays		



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Ablutions & change house	<1ha	GNR983 - Activities 10 and 25
with mobile sewage		OR
treatment plant		GNR984 - Activities 6 and 25
Fuel storage	<1ha	GNR984 - Activity 4
		GNR985 - Activity 10
Rehabilitation	Entire disturbed site	GNR983 - Activity 22
		GNR921 - Activities B(7) & B(9)

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 Project (SPV) and it is situated in the Greater Tubatse Municipality South West of Steelpoort 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 are a subsidiary of Eastern Platinum Limited and the relevant portions of the farm Spitskop 333 KT is 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 the mineral chromite 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).

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

ITEM	DETAIL	
Associated Minerals related to	Chrome Ore (Cr): Commodity Code B (also referred to as Chromite) is the mineral	
the proposed mining operation:	that will be mined.	
	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	

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	area applied for.
	Other related Minerals can be found:
	Platinum (Pt), Paladium (Pd), Rhodium (Ru), Ruthenium (Re), Osmium (Os),
	Iridium (Ir)) and base metals Copper (Cu), Nickel(Ni) and Gold(Au).
Depth of the mineral below	From sub outcrop (2m below surface) to in excess of 300m depth below surface.
surface:	
Geological formation:	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.
	The MG chromitite seams are of particular economic significance.
	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.
	These seams are situated approximately 380 metres below the UG2 platinum
	bearing seam.
	The current mineral right excludes Chromite seams associated with the UG2 and
	Merensky reefs

As part of the authorised prospecting and bulk sampling phase, some infrastructures has already been constructed. The existing infrastructures consist 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 Pollution Control Dams (PCD's);



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- Construction of storm water management features;
- 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 PCD's; 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.



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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.

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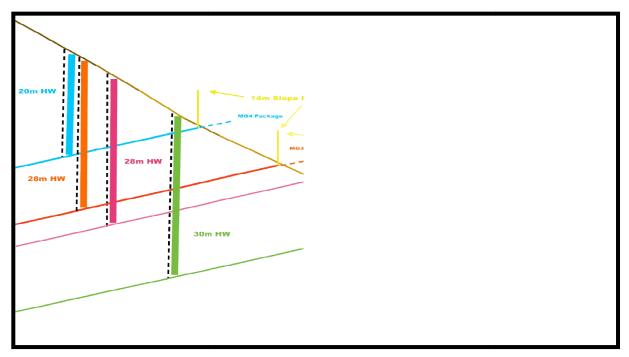


Figure 1: Image showing the mining bench heights from the MG4 to the MG1 bench

(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 2nd 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).

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

The design criteria can be summarized as follows:

Table 3: Design Parameters

Design Parameter	Parameter Value	Description
Pit Slopes	(From Surface to 80m below = 83 degrees)	Conservative slope assumption
Ramp Design	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, Caterpilar 773's)
Mining Bench	4m total bench height. Not the same as the	
Heights	blasting bench height. Refer to Figure above.	
Waste Dumping	Waste will be moved to the waste dump just on the final pit perimeter, with a lot of waste to be dumped back directly into the pit (Concurrent backfilling whilst mining).	Concurrent backfill mining proved in South Africa and Africa significantly reducing truck cycle time and equipment fleet requirements.
Batter angle	80m pit depth (Batter at 83 degrees),	Standard

Open Pit Mining

Open pit mining is proposed to mine the shallow ore on the Spitsvale project, 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 highwall side of the maximum highwall position;
- Monthly production of approximately 30,000tpm of RoM ore;



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• 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 MG 4,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 project. 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 at mining 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 Project plant.



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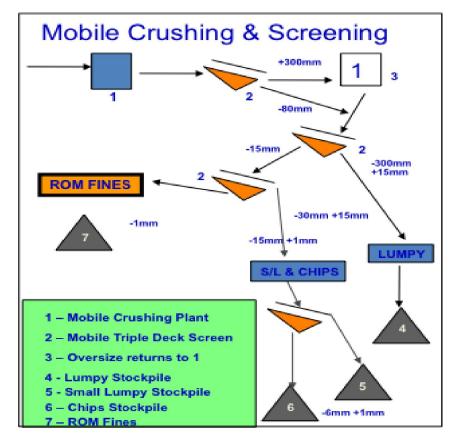


Figure 2: A schematic flow sheet and description of the major items in the proposed Spitsvale project process

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.

Due to the mining method being opencast mining the mining recovery is expected to be between 85 - 95 % with minimal dilution and with there being no gravity / spiral separation required thus a limited amount to no residue material is expected to be generated from the ROM that is screened. 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.



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Table 4: Forecast efficiency of the proposed process

Product	Typical size(mm)	Production per Annum(Tons)
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

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (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,	REFERENCE WHERE APPLIED (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use Liscence has/has not been applied for).
municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);		
	National Legislation and regulati	ions
Section 24 of the Constitution of South Africa Act no. 108 of 1996	Part A: EIA process followed Part B: Requirements included in the EMPr	Adherence 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 economy and social development.
The Minerals and Petroleum Resources Development Act, 2002 , Act No. 28 of 2002 (MPRDA)	Part A: EIA process followed Part B: Requirements included in the EMPr	 Submission of a mining works programme Submission of an application to a mining right Application for Environmental Authorisation in process (purpose of this report) A Rehabilitation, closure, and liability plan have been developed and are attached as Appendix S
National Environmental Management Act 107 of 1998 (NEMA)	Part A: EIA process followed Part B: Requirements included in the	 Development of an EMPr for the proposed activities. Application for authorisation resulting in the submission of this document.



The following regulations in terms of NEN	EMPr MA are applicable:	 Including emergency response procedures within the submitted EMPr. Ensuring compliance with a monitoring and audit schedule and plan.
GN R. 982: National Environmental Management Act (107/1998): Environmental Impact Assessment Regulations, 2014 (2014 EIA regulations)	Part A: EIA process followed Part B: Requirements included in the EMPr	Independent EAP appointed to ensure adherence with the EIA procedure.
GN R. 983 – 985: Listing notices 1 to 3	Part A: EIA process followed Part B: Requirements included in the EMPr	Application for authorisation of listed activities submitted followed by the submission of the EIR, EMPr, and Rehabilitation, closure, and liability plan.
GN R. 1147: Regulations pertaining to the financial provision for prospecting, exploration, mining or production	Part A: EIA process followed Part B: Requirements included in the EMPr	Submission of mine Rehabilitation, closure, and liability plan as Appendix. S to this report.
GN R. 549: Regulations to phase-out the use of PCB's materials and PCB's contaminated materials	Part A: EIA process followed Part B: Requirements included in the EMPr	
National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA)	Part A: EIA process followed Part B: Requirements included in the EMPr	 Requirements as stipulated in the Act are incorporated with the EMPr submitted for approval. Recommendations made by the specialist report (Appendix E) incorporated into this report as well as the EMPr.
The following regulations in terms of NEN	MAQA are applicable:	
GN 893: List of activities which result in atmospheric emissions	Part A: EIA process followed Part B: Requirements included in the	No licence required at this time of the proposed activity.



EMPr	
Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated in the EMPr.
Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated in the EMPr.
Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated in the EMPr.
Part A: EIA process followed Part B: Requirements included in the EMPr	In the event that any PCB containing product will be used on site this regulation will be applicable. Requirements incorporated in the EMPr.
Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated in the EMPr.
Part A: EIA process followed Part B: Requirements included in the EMPr	All waste management activities associated to the proposed mining operation must comply with the requirements set out by the Act. These requirements have been incorporated into the EMPr.
	Part A: EIA process followed Part B: Requirements included in the EMPr Part A: EIA process followed Part B: Requirements included in the EMPr Part A: EIA process followed Part B: Requirements included in the EMPr Part A: EIA process followed Part B: Requirements included in the EMPr Part A: EIA process followed Part B: Requirements included in the EMPr Part A: EIA process followed Part B: Requirements included in the EMPr Part A: EIA process followed Part B: Requirements included in the EMPr



GN R. 634: Waste classification and management regulations	Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated in the EMPr.	
GN R. 921: Activities listed requiring a waste management licence (WML)	Part A: EIA process followed Part B: Requirements included in the EMPr	Listed activity number 11 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)" An application for a WML will be submitted to the DMR as the competent authority.	
GN R. 625: National waste information regulations	Part A: EIA process followed Part B: Requirements included in the EMPr	As listed activity 11 of GN R. 921 will be triggered by the proposed mining activities, GN R. 625 will apply. Therefore the Spitsvale Project must register as a waste generator. These requirements will be included in the EMPr associated to the WML.	
GN R. 635: National Norms and Standards for the assessment of waste for landfill disposal	Part A: EIA process followed Part B: Requirements included in the EMPr	This regulation stipulates the requirements to assess generated waste for disposal to specific designed landfills. As a result the requirements stipulated in these regulations have been considered in the EMPr.	
GN R. 636: National norms and standards for disposal of waste to landfill	Part A: EIA process followed Part B: Requirements included in the EMPr	This regulation stipulates the general principles associated to the disposal of waste to landfill. As a result the requirements stipulated in these regulations have been considered in the EMPr.	
GN R. 926: National norms and standards for storage of waste	Part A: EIA process followed Part B: Requirements included in the EMPr	This regulation describes the general requirements for the management and storage of waste. As a result the requirements stipulated in these regulations have been considered in the EMPr.	



Environmental Conservation Act of 1989 (ECA) GN R. 425: Waste tyre regulations GN R. 341: Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials	Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated in the EMPr.		
National Water Act 36 of 1998 (NWA) The following regulations in terms of NW.	Part A: EIA process followed Part B: Requirements included in the EMPr A are applicable:	Application for a Water Use Licence (WUL) is in process. General conditions stipulated in the NWA have been incorporated in the EMPr.		
GN 704: Regulations on use of water for mining and related activities aimed at the protection of water resources	Part B: Requirements included in the EMPr An application for a WUL is in process.	The requirements have been incorporated into the EMPr and final site layout plan.		
Explosives Act 26 of 1956 & Regulations	Part A: EIA process followed Part B: Requirements included in the EMPr	 Requirements incorporated into the EMPr. Requirements to be incorporated into the Spitsvale Health and Safety management plan. Requirements to be included in the Drilling and Blasting procedure. 		
Hazardous Substances Act 15 of 1973	Part A: EIA process followed Part B: Requirements included in the EMPr	 Requirements incorporated into the EMPr. Requirements to be incorporated into the Spitsvale Health and Safety management plan. 		
Petroleum Products Act of 1977 GN R. 627: Regulations regarding petroleum products specification and	Part A: EIA process followed Part B: Requirements included in the	Throughout the construction, operation, and decommissioning phase of the proposed mining activities petroleum products will be used. These		



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standards	EMPr	requirements have been included in the EMPr.
Mine Health and Safety Act of 1996 GN R. 1237: Mines and works regulations GN R. 911: Mine health and safety regulations	Part A: EIA process followed Part B: Requirements included in the EMPr	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 have been incorporated into the EMPr. The following specific sections are applicable in this report and the EMPr: Storage of hazardous substances; Acquisition of hazardous chemicals; and Air conditioning and refrigerant equipment.
National Road traffic Act of 1996 GN R. 225: National road traffic regulations	Part A: EIA process followed Part B: Requirements included in the EMPr	The requirements set in these regulations have been incorporated into the EMPr. However this should also form part of the Spitsvale Mine Health and Safety Management plan and Traffic management plan. The section specifically considered in the EIR and EMPr are as follows: Transport of hazardous waste. Loading and offloading of dangerous goods.
Human Tissue Act 65 of 1983 GN R. 1935: GN R. 2878: National Health Act, 2003 – Regulations regarding the general control of human bodies, tissue, blood, blood products and gametes????	Part A: EIA process followed Part B: Requirements included in the EMPr	 Requirements incorporated into the EMPr. Requirements to be incorporated into the Spitsvale Health and Safety management plan. Requirements to be incorporated in the onsite Clinic management plan.
Medicines and related substances		



control Act 101 of 1965 & regulations			
Fertilizers, farm feeds, agricultural remedies and stock remedies Act 36 of 1947	Part A: EIA process followed Part B: Requirements included in the EMPr	The requirements specifically related to the use of herbicides and pesticides have been incorporated into the EMPr.	
Conservation of Agricultural Resources Act 43 of 1983 (CARA) GN R. 1048: Declared Weeds and Invader plants	Part A: EIA process followed Part B: Requirements included in the EMPr	The requirements have been incorporated into the EMPr and final site layout plan. This act also deals with permitting of land zoned as Agriculture. Requirements incorporated into the 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 (Appendix G).	
National Environmental Management: Biodiversity Act, 2002 (NEMBA)	Part A: EIA process followed Part B: Requirements included in the EMPr		
National Veldt and Forest Fire Act 101 of 1998	Part A: EIA process followed Part B: Requirements included in the EMPr	Measures to prevent the spreading of fires are incorporated into the EMPr.	
National Forest Act 84 of 1998	Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements incorporated into the 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 (Appendix G).	
National Heritage Resources Act 25 of 2000	Part A: EIA process followed Part B: Requirements included in the EMPr	The EIR & EMPr document complies with section 38(8) of the NHRA that stipulates that a Heritage Resources Management (HRM) process must be implemented if an evaluation of the impact of a 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 SAHRA and / or PRHAG must be taken into account prior to the granting of the consent.
Occupational Health and Safety Act (Act 85 of 1993) GN R.1248:	Part A: EIA process followed Part B: Requirements included in the EMPr	Requirements to be incorporated in the Mine Health and Safety plan.
	Government Policies	
Waste Management policies	Part A: EIA process followed Part B: Requirements included in the EMPr	In terms of waste management in South Africa, there are two main policies that have been considered in the development of the 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 were incorporated into the EMPr.
National Environmental Health Policy	Part A: EIA process followed Part B: Requirements included in the EMPr	This policy document is intended as a 'broad guideline for the effective implementation 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.
	SANS Standards	
Hazardous substances management	Part A: EIA process followed	The following two SANS standards were



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	Part B: Requirements included in the	incorporated into the EMPr:		
	EMPr	SANS 10089-1:2008 - Specifications for		
		above-ground storage facilities for		
		petroleum products		
		SANS 310: 2011 - Storage tank facilities		
		for hazardous chemicals: Above-ground		
		storage tank facilities for flammable,		
		combustible and non-flammable		
		chemicals.		
Provincial Legislation				
	Part A: EIA process followed	Requirements incorporated in the EMPr. The		
Limpopo Environmental	Part B: Requirements included in the	requirements for permitting of protected plants are		
Management Act No. 7 of 2003	EMPr	stipulated and form part of LEMA. Appendix G lists		
		the species requiring a permit to be removed.		
	Part A: EIA process followed	Requirements incorporated in the EMPr. Appendix		
Limpopo Conservation plan		G incorporated the requirements of the Limpopo		
	Part B: Requirements included in the	Conservation plan		
	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 km² (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, which 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. The strategy identifies the mining activities taking place in the area as the primary economic activity in GTM. It



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also outlines key issues that have to be taped 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 D 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 Spitsval 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 Project 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 Permit 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;



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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.

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:)

(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.

It may be worth noting the ecological status of the surrounding area that may be more sensitive and less desirable for

mining activities, if indeed so.

(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**, 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

project 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.

At the time of submitting this report to the competent authority the following infrastructures did not form part of the site

layout:

Storm water infrastructure;

33



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Location of PCD's; and

Detailed infrastructure associated to the Tubatse lay down area.

It is therefore recommended that before authorising the activity a detailed site layout plan be submitted indicating the details of all infrastructure associated to the proposed mining development.

(d) Technology to be used in the activity

No alternative in terms of the technology to be used have been 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 stockpilling, drilling and blasting, excavations, RoM product hauling and stockpilling, 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, 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. Thus the option of not implementing the activity is not advised.



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ii) Details of the Public Participation Process followed

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

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

Although the public participation process (PPP) has not been completed by the time finalising this report, the following steps have been taken to date:

- A Background Information Document (BID), with a registration & commenting sheet, was distributed to all the Potential Interested and Affected Parties (PI&As) on the 9th of December 2015.
- An advertisement was placed in the local newspaper (The Steelburger), on the 11th of December 2015.
- Notices were erected around the site on the 21st of December 2015.
- A public meeting was held on the 28th January 2016.All the PI&A's that made comments, showed interest, attended the meeting and are members of the organs of state automatically become Registered Interested and Affected Parties (RI&APs).

This report will be subjected to a 30 days review period by the I&AP registered on the current data base. All comment will be recorded and considered in the final EIR and EMPr before submitting to the competent authority for review.

iii) Summary of issues raised by I&APs

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

This section will be completed after the revised EIR & EMPr undergone the required 30 days PPP as stipulated by the 2014 EIA regulations.

However, **Appendix T** provides the draft PPP report describing the process followed to date.

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

Interested and Affected Parties	s	Date	Issues raised	EAPs response to issues as mandated by	Section and
		Comments		the applicant	paragraph reference
List the names of persons consulted	d in this	Received			in this report where
column, and					the issues and or
Mark with an X where those who i	must be				response were
consulted were in fact consulted.					incorporated.
AFFECTED PARTIES					
Landowner/s					
Lawful occupier/s of the land					
Landowners or lawful					
occupiers on adjacent					
properties					



ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES DMR REF: LP 30/5/1/2/3/2/1 (10104)

Municipal councillor			
Municipality			
Organs of state (Responsible			
for infrastructure that may be			
affected Roads Department,			
Eskom, Telkom, DWA etc.)			
Communities			
Dept. Land Affairs			
Traditional Leaders			
Dept. Environmental Affairs			
Other Competent Authorities			
affected			
OTHER AFFECTED PARTIES			
	l .		



Environmnetal Impact Assessment Report and Environmental Management Programme report for The Spitsvale Mining Right Application and Associated Activities DMR ref: LP 30/5/1/2/3/2/1 (10104)

INTERESTED PARTIES		



iv) Environmental attributes associated with the development footprint alternatives

(The environmental attributed 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. The section to follow summarises these findings and recommendations. It should be noted that the detailed reports are attached as appendices to this report. All mitigation measures and recommendations proposed are incorporated into the EMPr to this report.

(a) Type of environment affected by the proposed activity

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

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 conductive 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 3).



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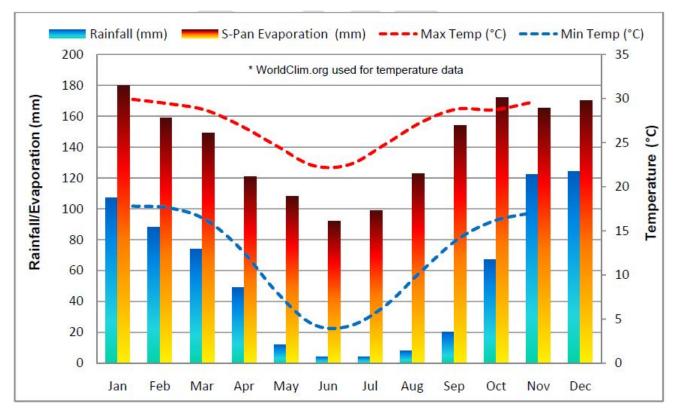


Figure 3: Summary of average climate for site

II. Topography

The proposed Spitsvale Project 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



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

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 Project 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 appatite 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 Project are located in the Eastern Limb with associated rock units from the Main Zone and Critical Zone.

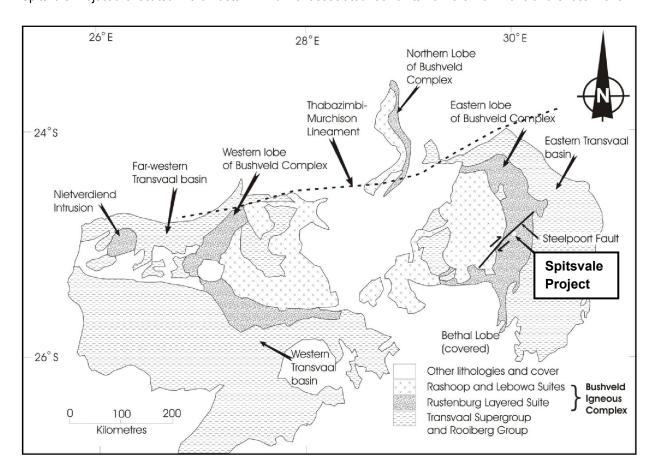


Figure 4: Approximate location of Spitsvale Project and the Steelpoort Fault within the Bushveld Igneous Complex.



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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 notire and mottled anothosite. The local geology associated with the Spitsvale Project ,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 Project. 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 Spitskope 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.

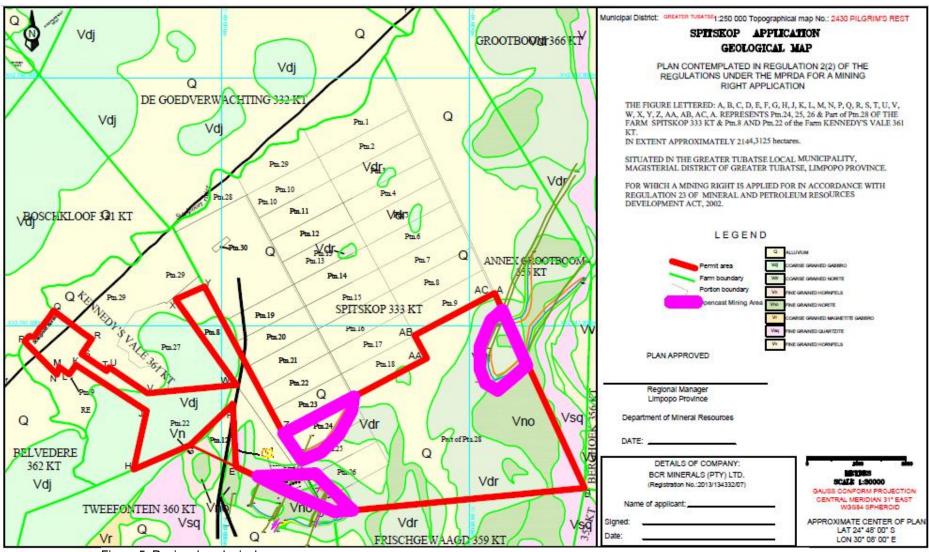


Figure 5: Regional geological map



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, PM10 and PM2.5 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), PM10 and PM2.5 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 PM10 and PM2.5 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/m2/day
 and ranged from approximately 57 569 mg/m2/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.



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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/m2/day for non-residential and 600 mg/m2/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/m2/day for non-residential and 600 mg/m2/day for residential areas.
 - Predicted incremental PM10 concentrations beyond the mine boundary are in compliance with the daily average standard of 75 μg/m3 and the annual average standard of 40 μg/m3.
 - Predicted incremental PM2.5 concentrations outside the mine's boundary are in compliance the daily average standard of 40 μg/m3 and the annual average standard of 20 μg/m3.
- 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 PM10 and PM2.5 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 E**.

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.



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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 developments/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. NSD01 is a community in the furthermost 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 till 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

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

itself.

Summary

Considering the LAleq,16/8hr daytime and night-time measurements a suburban Rating Level is proposed for the study area.

At times during night-time the LA90 and impulse setting may have indicated a rural setting, albeit briefly. However

considering the entire set of LAleq,10min set and LAleq,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 furthermost 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 EMP) 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.

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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 Lamin, Laeq, Lamax, Lamin, La10, La90 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 F**.

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 G**).



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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 18th and 19th January 2016.

A total of 110 species was recorded during this survey. These are listed in the attached detailed report (Table 1 Appendix

H). 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 Project

development site.

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 (SABAP₁

and SABAP2) 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 SABAP₁ database and is now about 25 years old. It was not recorded during this survey, and no

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suitable nesting cliffs are known to be present on the Spitsvale Project area. While Spitsvale may constitute part of the species' foraging range, the area of the site is relatively small (±2 200 ha) and developments 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 where 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 were 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 J**.

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d. Flora

A field study was conducted from the 2-6th 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 amplectens 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.



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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 developments.

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 G** and have been considered in the EMPr.

e. Invasive Plants

As part of the field study conducted from the 2-6th 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



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Recommendations on the proposed mitigation measures are found in the detailed report attached as **Appendix G** 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 microhabitat 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.



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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 1,275kgm³ during rehabilitation taking into consideration a 10% loss from the 11,010,000m³ 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.



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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 K**.



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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 project. 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



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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 1.097km2. This accounts for 0.022 million m3 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 527m3/month and 8

065m3/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 L**.

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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
- Development of 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 M**.

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,



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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, NO3, SO4, HCO3, NH4, PO4,);
 - Major cations (K, Na, Mg, Ca, NH4,); 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.

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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.

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The overall nett-rating for the construction phase is moderately-negative before mitigation and lownegative 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 moderatelynegative 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 netrating 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 my 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.



ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES DMR REF: LP 30/5/1/2/3/2/1 (10104)

- 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 lownegative 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 N.



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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 D**). 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 project 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.



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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 tool 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 consulted 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 O**.



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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



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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 P**.



(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

Summarised Description Of Land Capability Criteria							
Wetlands, Pans, Drainage	Land with organic soils or supporting hygrophilous vegetation where soil and						
Lines	vegetation processes are water determined.						
Arable	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						
(>600mm)	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.						
Grazing	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						
(250 – 600mm)	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.						
Wilderness	Land which does not qualify as wetland, arable or grazing land.						
(<250mm)							

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

Table 8: Land use

Area	Land Use	Surface Area (ha)	% of Total
Portions 8, 22 Farm	Mining & Industrial	97	4,48
Kennedy's Vale 361KT &	Natural Veld	1,899	87,69
Portions 24, 25, 26 and 28	Ploughed Land	81	3,75
Farm Spitskop 333KT	Settlement	75	3,46
	Wetlands	14	0,62
	Total	2,166	100

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

Table 9: Land capability

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

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

(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.

Infrastructures associated to the proposed Spitsvale Mine are as follows:

- Access roads;
- River crossings;
- Storm water management infrastructures 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;
- Pollution Control Dams (PCD's);
- 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;



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Apart from the infrastructures associated to the mining development, a number of environmentally and socially sensitive receptors were identified. **Appendix Q** 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 Q.

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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 to the proposed activities. The significance of each potential impact are then rated by considering the probability, the duration of the impact/activity, the extend of the impact, and the magnitude according to the methodology described in section vi) of this document.

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

Construction Phase					
Aspect:	Air Quality				

Activity:	Access and hauling along roads i.e. during the construction of roads						
Impact:	Dust Generation						
	Direct Impact: Ro	ad construction	involves the remo	val of rock and earth	by grading or digging		
	during construction	n. Vegetation is	removed, grading	and paving takes p	place using a range of		
	road construction	equipment. Thi	s often leads to t	he generation of fu	gitive dust comprising		
	TSP, PM10 and PM	M2.5 from the di	rt roads.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	2	6	5	45		
Post-Mitigation	1	1	4	3	18		
Mitigation Measures:	Fugitive dust gener	ration can be co	ontrolled in the foll	owing ways:			
	(1) Development of	f a dust fallout n	nonitoring and mar	nagement plan;			
	(2) Frequent Inspe	(2) Frequent Inspections; and					
	(3) Reporting and r	(3) Reporting and recording incidents related to air quality.					
	A number of recon	nmendation res	ulted from the Air	Quality Assessment	(Appendix E). These		
	recommendations are included in Part B of this report. One of the recommendations is to						
	develop a detailed	develop a detailed air quality management plan (focusing on sources of dust located in close					
	proximity to the r	esidential rece	ptors within the p	project boundary) e	nsuring adherence to		
	thresholds stipula	ted in the Ba	seline Air Qualit	y Impact Assessm	ent report (BAQIAR)		
	(Appendix E) prior	to the commer	cement of operation	ons.			



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There are also a number of legislative requirements stipulated in the following regulations:
GN R. 283: National reporting regulations;
GN R. 1210: National Ambient Air quality standards; and
GN R. 897: National dust control regulations.

Activity:	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure					
Impact:	Dust Generation					
	Direct Impact: Ve	getation is remov	red, grading and p	paving to prepare the	e lay down areas takes	
	place using a rang	ge of constructio	n equipment. Thi	s often leads to the	generation of fugitive	
	dust comprising T	SP, PM10 and	PM2.5. The gene	eration of dust durin	ng these activities wil	
	affect the visual en	vironment negati	vely.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	2	6	5	45	
Post-Mitigation	1	1	6	4	32	
Mitigation Measures:	Fugitive dust gener	ration can be <i>col</i>	ntrolled in the foll	owing ways:		
	(1) Development of	f a dust fallout m	onitoring and mar	nagement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording inciden	ts related to air qu	uality.		
	A number of recon	nmendation resu	Ited from the Air	Quality Assessment	(Appendix E). These	
	recommendations	are included in	Part B of this re	eport. One of the re	ecommendations is to	
	develop a detailed	air quality mana	gement plan (fo	cusing on sources o	f dust located in close	
	proximity to the r	esidential recep	tors within the p	oroject boundary) e	nsuring adherence to	
	thresholds stipula	ted in the Bas	eline Air Qualit	y Impact Assessm	ent report (BAQIAR	
	(Appendix E) prior	to the commend	ement of operation	ons.		
	There are also a number of legislative requirements stipulated in the following regulations:					
	• GN R. 283	3: National report	ting regulations;			
	GN R. 1210: National Ambient Air quality standards; and					
	• GN R. 12	10: National Amb	ient Air quality sta	andards; and		

Activity:	5. Mining offices (construction and operation) i.e. operation of training centres, offices and						
	kitchen facilities						
Impact:	Dust Generation						
	Direct Impact: During the construction of infrastructures areas are to be cleared of vegetation.						
	This often leads to the generation of fugitive dust comprising TSP, PM10 and PM2.5.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		



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Pre-Mitigation	1	1	6	5	40			
Post-Mitigation	1	1	6	3	24			
Mitigation Measures:	Fugitive dust gener	ation can be cont	rolled in the follow	wing ways:				
	(1) Development of	f a dust fallout mo	nitoring and mana	gement plan;				
	(2) Frequent Inspec	ctions; and						
	(3) Reporting and r	ecording incidents	related to air qua	lity.				
	A number of recon	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These						
	recommendations are included in Part B of this report. One of the recommendations is to							
	develop a detailed	air quality manag	ement plan (focu	ising on sources of d	ust located in close			
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensu	uring adherence to			
	thresholds stipulat	thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR)						
	(Appendix E) prior	to the commence	ment of operation	S.				
	There are also a nu	There are also a number of legislative requirements stipulated in the following regulations:						
	• GN R. 283	GN R. 283: National reporting regulations;						
	• GN R. 12 ²	10: National Ambie	ent Air quality stan	dards; and				
	• GN R. 897	7: National dust co	entrol regulations.					

Activity:	8. Pollution Control Dams (PCD's) i.e. Construction and operation						
Impact:	Dust Generation	Dust Generation					
	Direct Impact: Du	ring the construct	ion of infrastruct	ures areas are to be	cleared of vegetation.		
	This often leads to	the generation of	fugitive dust con	nprising TSP, PM10	and PM2.5.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	4	5	30		
Post-Mitigation	1	1	2	3	12		
Mitigation Measures:	Fugitive dust gener	ration can be <i>con</i>	trolled in the foll	owing ways:			
	(1) Development of	f a dust fallout mo	nitoring and mar	nagement plan;			
	(2) Frequent Inspe	ctions; and					
	(3) Reporting and r	ecording incident	s related to air qu	uality.			
	A number of recon	nmendation result	ted from the Air	Quality Assessment	(Appendix E). These		
	recommendations	are included in I	Part B of this re	eport. One of the re	ecommendations is to		
	develop a detailed	air quality manag	gement plan (fo	cusing on sources o	of dust located in close		
	proximity to the r	esidential recepto	ors within the p	oroject boundary) e	nsuring adherence to		
	thresholds stipula	thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR)					
	(Appendix E) prior	to the commence	ement of operation	ons.			
	There are also a nu	umber of legislativ	e requirements s	stipulated in the follo	wing regulations:		



•	GN R. 283: National reporting regulations;
•	GN R. 1210: National Ambient Air quality standards; and
•	GN R. 897: National dust control regulations.

Activity:	9. Stores, workshop	9. Stores, workshops &wash bays						
Impact:	CO ₂ emissions an	CO₂ emissions and release of noxious						
	Direct Impact: Th	e use of diesel of	perated construc	tion equipment will c	ause a contributing			
	factor the BCR M	inerals (Pty) Ltd	carbon footprint.	The storage of dies	sel poses a risk of			
	releasing noxious g	jasses.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	1	4	5	45			
Post-Mitigation	4	1	4	3	27			
Mitigation Measures:	CO ₂ emissions and	the release of no	xious gasses can	be <i>controlled</i> in the	following ways:			
	(1) Develop and ma	aintain a carbon fo	ootprint reporting p	oolicy;				
	(2) Monitor the cart	oon footprint throu	ghout the entire li	fe cycle of the Spitsva	ıl project;			
	(3) Develop and im	plement a hazard	ous substance ma	nagement plan; and				
	(4) Reporting and r	ecording incidents	S.					
	A number of recom			uality Assessment (A	ppendix E.). These			
	•	list of requiremer		Atmospheric Pollution gulating emissions for				

Activity:	11. Fuel operating	11. Fuel operating power genenerators					
Impact:	CO ₂ emissions an	CO₂ emissions and release of noxious					
	Direct Impact: Th	e use of diesel of	perated construc	tion equipment will c	ause a contributing		
	factor the BCR M	inerals (Pty) Ltd	carbon footprint.	The storage of dies	sel poses a risk of		
	releasing noxious g	releasing noxious gasses.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	1	4	5	45		
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	CO ₂ emissions and the release of noxious gasses can be <i>controlled</i> in the following ways:						
	(1) Develop and maintain a carbon footprint reporting policy;						
	(2) Monitor the carb	oon footprint throu	ighout the entire li	fe cycle of the Spitsva	al project;		



- (3) Develop and implement a hazardous substance management plan; and
- (4) Reporting and recording incidents.

A number of recommendation resulted from the Air Quality Assessment (**Appendix E**.). These recommendations are included in Part B of this report.

GN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of 1965 stipulated a list of requirements in terms of regulating emissions form diesel operated vehicles/plant/equipment.

Activity:	13. Fuel storage							
Impact:	Release of noxious gasses							
	Direct Impact: Evaporation of diesel fuel and heavy fuel from temporary tanks and possible							
	Direct Impact: 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							
		•		e used for re-identify	or neavy macrimery			
	and trucks poses a	J	ŭ	a .				
	-	·		the noxious gasses	s may lead to the			
	development of res	piratory problems	and irritation to e	eyes.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	4 1 8 5 65						
Post-Mitigation	4 1 6 3 33							
Mitigation Measures:	T			C. II				
	The release of noxi	•						
	(1) Develop and i	mplement a Hea	Ith and Safety n	nanagement plan add	dressing the proper			
	storage, managem	ent, handling, and	I transport of haza	ardous substances;				
	(2) All personnel	to be trained in	the handling, s	storage, management	t, and transport of			
	hazardous substan	ces; and						
	(3) Reporting and r	ecording incidents	S.					
	Adherence to the f	following SANS st	tandards will con	tribute to avoiding the	release of noxious			
	gasses:							
)89-1:2008 - Spe	cifications for abo	ve-ground storage fac	cilities for petroleum			
	products							
	• SANS 31	0: 2011 - Storag	e tank facilities	for hazardous chemic	cals: Above-ground			
	storage ta	nk facilities for fla	mmable, combus	tible and non-flammab	ole chemicals.			



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Activity:	15. Transport of construction material, mobile plant and equipment to the site						
Impact:	Dust Generation						
	Direct Impact: Co	Direct Impact: Continuous use of haul road often leads to the generation of fugitive dust					
	comprising TSP, F	M10 and PM2.5	from the dirt ro	ads. The generation	of dust during these		
	activities will affect	the visual enviror	ment negatively				
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout ma	ay lead to unhealthy		
	environment for em	ployees and surr	ounding commur	nities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	6	5	40		
Post-Mitigation	1	1 1 6 3 24					
Mitigation Measures:	Fugitive dust gener	ation can be <i>con</i>	trolled in the foll	owing ways:	•		
	(1) Development of	a dust fallout mo	nitoring and mar	nagement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and r	ecording incidents	s related to air qu	uality.			
	A number of recon	nmendation result	ted from the Air	Quality Assessment (Appendix E). These		
	recommendations	are included in f	Part B of this re	eport. One of the red	commendations is to		
	develop a detailed	air quality manag	gement plan (fo	cusing on sources of	dust located in close		
	proximity to the re	esidential recepto	ors within the p	project boundary) en	suring adherence to		
	thresholds stipulat	ted in the Base	eline Air Qualit	y Impact Assessme	nt report (BAQIAR)		
	(Appendix E) prior	to the commence	ement of operation	ons.			
	There are also a nu	ımber of legislativ	re requirements s	stipulated in the follow	ing regulations:		
	• GN R. 283	3: National reporti	ng regulations;				
	• GN R. 121	10: National Ambi	ent Air quality sta	andards; and			
	• GN R. 897	7: National dust co	ontrol regulations	3.			



Aspect: Human Health and Safety

Activity:	Access and hauling along roads i.e. during the construction of roads							
Impact:	Dust generation							
	Indirect Impact: 0	Indirect Impact: Overexposure to dust comprising of TSP, PM10 and PM2.5 generated from						
	site clearing and fro	om traffic on unp	aved roads pose	s a risk in the health	of employees and the			
	surrounding comm	unities.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	2	1	6	5	45			
Post-Mitigation	1	1	4	3	18			
Mitigation Measures:	Dust generation ca	n be <i>controlled</i>	in the following w	ays:				
	(1) Development of	f a dust fallout mo	onitoring and mar	nagement plan;				
	(2) Frequent Inspec	ctions; and						
	(3) Reporting and r	ecording incident	ts related to air q	uality.				
	A number of recon	nmendation resul	Ited from the Air	Quality Assessment	(Appendix E). These			
	recommendations	are included in	Part B of this re	eport. One of the re	ecommendations is to			
	develop a detailed	air quality mana	gement plan (fo	cusing on sources o	of dust located in close			
	proximity to the re	esidential recept	tors within the p	project boundary) e	nsuring adherence to			
	thresholds stipulat	ted in the Bas	eline Air Qualit	y Impact Assessm	ent report (BAQIAR)			
	(Appendix E) prior	to the commend	ement of operation	ons.				
	There are also a nu	umber of legislati	ve requirements	stipulated in the follo	wing regulations:			
	• GN R. 283	3: National report	ing regulations;					
	• GN R. 12 ⁻	10: National Amb	ient Air quality st	andards; and				
			ontrol regulations	·				

Activity:	4. Onsite Clinic	4. Onsite Clinic					
Impact:	Medical Waste ge	Medical Waste generation					
	Direct Impact: Im	proper managem	nent of medical v	vaste generated from	first aid incidents		
	during the construc	tion and operation	nal phase poses a	high risk to human he	ealth.		
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	3	2	6	4	44		
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	The risk to human I	nealth from gener	ated medical wast	e can be <i>controlled</i> i	n following ways:		
	(1) Develop and implement a Waste Management plan.						
	(2) Develop and im	plement a waste i	ecoding procedur	e.			



(3) Develop and implement a Health and Safety management plan, including the handling of medical waste.

Activity:	8. Pollution Control	8. Pollution Control Dams (PCD's) i.e. Construction and operation					
Impact:	Smell nuisance	Smell nuisance					
	Direct Impact: Lac	ck of maintenance	and treatment m	ay result in a smelling	g environment. May		
	lead to a potential	nuisance to loc	al communities a	nd land users in clo	se proximity to the		
	authorised site.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	6	5	55		
Post-Mitigation	1	2	6	3	27		
Mitigation Measures:	The generation of s	smell from the PCI	D's can be <i>avoide</i>	ed in the following way	/s:		
	(1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP).						
	(2) Frequent inspec	(2) Frequent inspections of areas posing a possible risk of causing smell nuisance.					
	(3) Development ar	nd implementation	n of an incident res	sponse plan.			

Activity:	9. Stores, workshops &wash bays						
Impact:	Chemical fires						
	Direct Impact: The improper storage of hazardous substances poses a risk of chemical fires.						
	In the event of a c	chemical fire the i	mpact to the suri	ounding environment	is significant. Fires		
	may lead to the los	s of ecosystems,	damage to prope	ties and fatalities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	2	10	4	52		
Post-Mitigation	1	1 1 10 2 24					
Mitigation Measures:	Chemical fires can	be avoided n the	following ways:	1			
	(1) Develop and im	plement a Hazard	lous substances r	management plan.			
	(2) Develop an en	nergency procedu	ire addressing in	particular the manag	gement of chemical		
	fires and spill respo	onse.					
	(3) Report and reco	ord all incidents re	lated to chemical	fires.			
	(4) Employees mu	st be trained on	emergency respo	onse procedures requ	ired to counter the		
	nature and hazards	of an accidental	release.				
	(5) Employees mu	st be familiar with	and have receive	red the appropriate tra	aining regarding the		
	handling and storag	ge practices, for a	ll containers with	which they will come i	nto contact.		
	(6) Document the	types and amou	unts of hazardou	s materials present	on the project site		
	(including for exam	ple the name and	d description, cla	ssification, regulatory	reporting threshold,		

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quantities, characteristics, analysis of potential consequence, identification of location, details of responsible persons, detail of availability of spill response equipment etc.).

- (7) The emergency response procedure should 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.
- (8) Procedures should 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.

Activity:	10. Ablutions & change house with mobile sewage treatment plant						
Impact:	Smell nuisance	Smell nuisance					
	Direct Impact: Lac	ck of maintenance	e and treatment n	nay result in a smellin	g environment. May		
	lead to a potential	I nuisance to loc	cal communities a	and land users in clo	se proximity to the		
	authorised site.	authorised site.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	2	6	5	60		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	The generation of s	smell from the PC	D's can be <i>avoid</i>	ed in the following wa	ys:		
	(1) Develop and ma	(1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP).					
	(2) Frequent inspec	(2) Frequent inspections of areas posing a possible risk of causing smell nuisance.					
	(3) Development a	nd implementation	n of an incident re	sponse plan.			

Activity:	11. Fuel operating	11. Fuel operating power generators					
Impact:	Chemical fires	Chemical fires					
	Direct Impact: The	Direct Impact: The improper storage of hazardous substances poses a risk of chemical fires.					
	In the event of a c	hemical fire the i	mpact to the sur	rounding environmen	t is significant. Fires		
	may lead to the loss of ecosystems, damage to properties and fatalities.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	2	10	5	65		
Post-Mitigation	1 1 10 2 24						
Mitigation Measures:	Chemical fires can	be avoided n the	following ways:	•			

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- (1) Develop and implement a Hazardous substances management plan.
- (2) Develop an emergency procedure addressing in particular the management of chemical fires and spill response.
- (3) Report and record all incidents related to chemical fires.
- (4) Employees must be trained on emergency response procedures required to counter the nature and hazards of an accidental release.
- (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.
- (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.).
- (7) The emergency response procedure should 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.
- (8) Procedures should 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.

Activity:	13. Fuel storage						
Impact:	Emission of noxio	Emission of noxious fumes					
	Indirect Impact:	Over exposure	of employees to	the noxious gasses	may lead to the		
	development of res	piratory problems	and irritation to e	yes.			
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	1	1	8	5	50		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:							
	The release of noxi	ious gasses can b	e avoided in the	following ways:			
	(1) Develop and implement a Health and Safety management plan addressing the proper						
	storage, manageme	ent, handling, and	I transport of haza	rdous substances;			
	(2) All personnel	to be trained in	the handling, s	storage, management	t, and transport of		

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hazardous substances; and

(3) Reporting and recording incidents.

Adherence to the following SANS standards will contribute to avoiding the release of noxious gasses:

- SANS 10089-1:2008 Specifications for above-ground storage facilities for petroleum products
- SANS 310: 2011 Storage tank facilities for hazardous chemicals: Above-ground storage tank facilities for flammable, combustible and non-flammable chemicals.

Impact:

Chemical fires

Direct Impact: 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. Fires may lead to the loss of ecosystems, damage to properties and fatalities.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	2	10	5	65
Post-Mitigation	1	1	10	2	24

Mitigation Measures:

Chemical fires can be **avoided** n the following ways:

- (1) Develop and implement a Hazardous substances management plan.
- (2) Develop an emergency procedure addressing in particular the management of chemical fires and spill response.
- (3) Report and record all incidents related to chemical fires.
- (4) Employees must be trained on emergency response procedures required to counter the nature and hazards of an accidental release.
- (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.
- (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.).
- (7) The emergency response procedure should 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.



(8) Procedures should 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.

Activity:	14. Employment of	workers and proc	curement of constr	ruction materials		
Impact:	Health and Safety	Health and Safety of employees				
	Direct Impact: Inc	Direct Impact: Increased demand for labour and employees from different cultures may pose				
	the risk to the lack	the risk to the lack of knowledge and skills on health and safety in the work place. Different				
	human behaviours	human behaviours deals with different situations and if there is not a simplified system of				
	managing health a	nd safety risk, sit	uations resulting l	oss or injury of huma	n life may be a end	
	result.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	The health and safe	ety of employees	can be <i>controlled</i>	in the following ways	S:	
	(1) Develop and implement a Health and Safety plan.					
	(2) All employees to	(2) All employees to be trained in health and safety in the work place.				
	(3) Develop and im	plement an emplo	oyee training prog	ram.		
	(4) Keep and maint	tain a record of all	training of employ	yees.		

Activity:	15. Transport of co	15. Transport of construction material, mobile plant and equipment to the site					
Impact:	Dust Generation						
	Indirect Impact: 0	Overexposure to o	dust comprising of	of TSP, PM10 and PM	2.5 generated from		
	traffic on unpaved	d roads poses a	risk in the he	alth of employees a	nd the surrounding		
	communities.	communities.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	1	1	8	5	50		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Dust generation ca	n be <i>controlled</i> i	n the following wa	ays:			
	(1) Development of	f a dust fallout mo	nitoring and man	agement plan;			
	(2) Frequent Inspections; and						
	(3) Reporting and recording incidents related to air quality.						
	A number of recon	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These					
	recommendations	are included in I	Part B of this re	port. One of the reco	ommendations is to		

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES DMR REF: LP 30/5/1/2/3/2/1 (10104)

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) (**Appendix E**) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Aspect:		Topography and Visual Environment						
	Activity:	1. Access and hauling along roads i.e. during the construction of roads						
	Impact:	Dust generation	Dust generation					
		Direct Impact: Roa	ad construction in	volves the remove	val of rock and earth	by grading or digging		
		during construction	. Vegetation is re	emoved, grading	and paving takes p	lace using a range of		
		road construction	equipment. This	often leads to the	ne generation of fug	gitive dust comprising		
		TSP, PM10 and PN	12.5 from the dirt	roads.				
Significa	nce rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigat	tion	1	1 1 6 5 40					
Post-Mitiga	ation	1	1 1 4 3 18					
Mitigation	Measures:	Dust generation can be <i>controlled</i> in the following ways:						
		(1) Development of	a dust fallout mo	nitoring and man	agement plan;			
		(2) Frequent Inspec	ctions; and					
		(3) Reporting and recording incidents related to air quality.						
		A number of recommendation resulted from the Air Quality Assessment (Appendix E). These						
		recommendations are included in Part B of this report. One of the recommendations is to						
		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)						
		(Appendix E) prior to the commencement of operations.						
		There are also a nu	ımber of legislativ	e requirements s	tipulated in the follow	ving regulations:		
		• GN R. 283	3: National reporti	ng regulations;				
		• GN R. 12 ⁴	10: National Ambi	ent Air quality sta	andards; and			
		• GN R. 897	7: National dust c	ontrol regulations	i.			



Activity:	2. Site clearing and	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure					
Impact:	Alteration of topo	graphy					
	Direct Impact: Ve	getation stripping	during site clearing	ng and topsoil remova	al activities will alter		
	the visual environm	ent and topograp	hy.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	3	2	6	5	55		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	The affects of alter	The affects of altering the topography caused by vegetation clearance and topsoil stripping can					
	be <i>remedied</i> in the following ways:						
	(1) Record keeping of the topography and environmental state before the commencement of						
	any activities.						
	(2) Development of	rehabilitation pla	n.				

Activity:	5. Mining offices i.e	5. Mining offices i.e. operation of training centres, offices and kitchen facilities				
Impact:	Alteration of topo	Alteration of topography				
	Direct Impact: (Direct Impact: Construction of mining facilities will alter the topography and visual				
	environment.	environment.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	2	1	4	3	21	
Mitigation Measures:	The affects of alter	The affects of altering the topography caused by vegetation clearance and topsoil stripping can				
	be <i>remedied</i> in the following ways:					
	(1) Record keeping of the topography and environmental state before the commencement of					
	any activities.					
	(2) Development of	rehabilitation plar	٦.			

Activity:	15. Transport of construction material, mobile plant and equipment to the site					
Impact:	Dust generation	Dust generation				
	Direct Impact: Roa	Direct Impact: Road construction involves the removal of rock and earth by grading or digging				
	during construction	during construction. Vegetation is removed, grading and paving takes place using a range of				
	road construction	road construction equipment. This often leads to the generation of fugitive dust comprising				
	TSP, PM10 and PM2.5 from the dirt roads.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	3	1	6	5	50	
Post-Mitigation	1	1	6	3	24	

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Mitigation Measures:	Dust generation can be <i>controlled</i> in the following ways:					
	(1) Development of a dust fallout monitoring and management plan;					
	(2) Frequent Inspections; and					
	(3) Reporting and recording incidents related to air quality.					
	A number of recommendation resulted from the Air Quality Assessment ({\bf Appendix}~{\bf E}). These					
	recommendations are included in Part B of this report. One of the recommendations is to					
	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)					
	(Appendix E) prior to the commencement of operations.					
	There are also a number of legislative requirements stipulated in the following regulations:					
	GN R. 283: National reporting regulations;					
	GN R. 1210: National Ambient Air quality standards; and					
	GN R. 897: National dust control regulations.					
	ı ,					

Aspect: Surface Water quality

Activity:	Access and hauling along roads i.e. during the construction of roads						
Impact:	Hydrocarbon Con	Hydrocarbon Contamination					
	Direct Impact: Th	roughout the co	nstruction phase	construction equipm	ent are used. This		
	poses a risk of hyd	rocarbon spills if	equipment is not	maintained. Dependir	ng on the size of the		
	spill the level of c	ontamination may	vary from insig	nificant to significant	and may affect the		
	surrounding water	surrounding water quality (both surface and sub-surface) as well as the soil quality.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	1	1	6	4	32		
Post-Mitigation	1 1 6 3 24						
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contami	nation can be <i>contro</i>	Iled in the following		
	ways:						
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing					
	handling, storage, and transport of hazardous substances.						
	(2) Develop and ir	nplement an eme	ergency response	e procedure addressir	ng the procedure in		
	case of a chemical	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well a	accidents as well as addressing remediation procedures.					
	(3) Development a	nd implementation	of an incident re	porting procedure.			
Impact:	Sedimentation an	d siltation of wat	ercourses				



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	Direct Impact: Co	Direct Impact: Constructing access roads through drainage lines may cause sedimentation				
	and siltation of wat	•	•			
	Indirect Impact: S	Storm water runo	ff of dirt roads m	ay cause sedimentat	tion and siltation of	
	nearby watercourse	es.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	8	5	60	
Post-Mitigation	2	1	6	4	36	
Mitigation Measures:	asures: Surface water quality can be <i>controlled</i> in the following ways:					
	of water quality m	onitoring plan.				
	(2) Reporting and r	ecording incidents	S.			
Impact:	Alteration of drain	nage patterns				
	Direct Impact: Th	ne construction o	f access roads t	hrough drainage line	s may lead to the	
	siltation of streams	as well as lead t	o erosion along th	ne river banks that wi	ill affect the surface	
	water quality negat	ively.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	6	5	50	
Post-Mitigation	1 1 6 3 24					
Mitigation Measures:	The effects on sur	face water quality	resulting from th	e alteration in draina	ge patterns can be	
	remedied in the fol	llowing ways:				
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting v	vater quality.		
	(3) Develop a reha	abilitation plan spe	ecifically addressing	ng the rehabilitation r	measures related to	
	reinstatement of dr	ainage lines.				
Impact:	Destruction of up	stream tributarie	s and reduction i	n water in the catch	ment	
	Direct Impact: The	e destruction of tri	butaries may lead	to a limited volume of	of water available to	
	the downstream us	sers. The reductio	n in water in the o	catchment may cause	e the degradation of	
	surface water quality					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	6	4	40	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	The effects on sur	face water quality	resulting from the	e destruction of upstr	eam tributaries and	
	reduction in water i	n the catchment o	an be <i>remedied</i> i	n the following ways:		
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting v	vater quality.		
	(3) Develop a reha	abilitation plan spe	ecifically addressing	ng the rehabilitation r	measures related to	



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reinstatement of drainage lines.

Activity:	2. Site clearing and	I topsoil stripping f	for lay down area	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure					
Impact:	Hydrocarbon Con	tamination							
	Direct Impact: Th	roughout the cor	nstruction phase	construction equipr	nent are used. This				
	poses a risk of hyd	rocarbon spills if	equipment is not	maintained. Dependi	ng on the size of the				
	spill the level of contamination may vary from insignificant to significant and may affect the								
	surrounding water	quality (both surfa	ce and sub-surfac	ce) as well as the soi	l quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	3	1	6	5	50				
Post-Mitigation	1	1	6	4	32				
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamir	nation can be contro	olled in the following				
	ways:								
	(1) Develop and im	plement a Hazaro	dous substances	management plan sp	pecifically addressing				
	handling, storage,	and transport of ha	azardous substan	ces.					
	(2) Develop and ir	nplement an eme	ergency response	procedure address	ing the procedure in				
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or								
	accidents as well a	s addressing reme	ediation procedure	es.					
	(3) Development a	nd implementation	of an incident re	porting procedure.					
Impact:	Sedimentation an	d siltation of wat	ercourses						
	Direct Impact: Co	onstructing access	roads through	drainage lines may	cause sedimentation				
	and siltation of water	ercourses if not m	anaged properly.						
	Indirect Impact: S	Storm water runot	ff of dirt roads m	nay cause sedimenta	ation and siltation of				
	nearby watercourse	es.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	3	2	6	5	55				
Post-Mitigation	1	1	6	4	32				
Mitigation Measures:	Surface water qual	•		3					
	1) Development an	•		nonitoring plan.					
	(2) Reporting and r								
Impact:	Water level reduc								
	-				f 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								
	poses a risk to affe	,		-					



Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	2	1	6	5	45			
Post-Mitigation	1	1	6	3	24			
Mitigation Measures:	Water level reduction and contamination affecting the surface water quality can be controlled in							
	following ways:	following ways:						
	(1) Development ar	(1) Development and implementation of water quality monitoring plan.						
	(2) Development of	a storm water ma	anagement plan.					
	(3) Reporting and re	ecording incidents	S.					
	(4) Create awarene	(4) Create awareness of water conservation.						
Impact:	Alteration of drain	age patterns						
	Direct Impact: Th	e construction of	f access roads t	hrough drainage line	s may lead to the			
	siltation of streams	as well as lead t	o erosion along t	he river banks that wi	ill affect the surface			
	water quality negati	ively.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	2	6	3	36			
Mitigation Measures:	The effects on surf	face water quality	resulting from the	ne alteration in draina	ge patterns can be			
	remedied in the fol	lowing ways:						
	(1) Develop a water	r monitoring mana	agement plan.					
	(2) Record and repo	ort all incidents re	lated to affecting	water quality.				
	(3) Develop a reha	bilitation plan spe	ecifically addressi	ng the rehabilitation r	neasures related to			
	reinstatement of dra	ainage lines.						

Activity:	3. Weigh bridge							
Impact:	Hydrocarbon Contamination							
	Direct Impact: The	Direct Impact: Throughout the operational phase hauling vehicles poses a risk of hydrocarbon						
	spills if not maintain	spills if not maintained. Depending on the size of the spill the level of contamination may vary						
	from insignificant to	from insignificant to significant and may affect the surrounding water quality (both surface and						
	sub-surface) as well as the soil quality.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	1	1	8	5	50			
Post-Mitigation	1	1 1 6 3 24						
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following							
	ways:	ways:						
	(1) Develop and in	nplement a Haz	ardous substances	s management plan	specifically addressing			



handling, storage, and transport of hazardous substances.

- (2) Develop and implement an emergency response procedure addressing the procedure in case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or accidents as well as addressing remediation procedures.
- (3) Development and implementation of an incident reporting procedure.

Activity:	5. Mining offices i.e. operation of training centres, offices and kitchen facilities						
Impact:	General waste generation & Littering - Surface Water quality due to leachates						
	Direct Impact: Littering throughout the construction and operational phase poses the risk of the						
	visual environment	visual environment to be affected negatively. The storing of waste onsite for an extended time					
	may cause the forn	may cause the formation of leachate that will affect the soil and water quality of the surrounding					
	environment in a negative way.						
	Indirect Impact: Exposure of leachate to the natural environment poses a health risk to the						
	surrounding fauna	surrounding fauna and flora habitats as well as human health.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	6	3	27		
Post-Mitigation	4	4 1 2 2 14					
Mitigation Measures:	Surface Water qua	Surface Water quality due to leachates can be <i>controlled</i> in the following ways:					
	(1) Develop and i	(1) Develop and implement as waste management plan with the focus on reuse, reduce,					
	recycle, or avoid.						
	(2) Development ar	nd maintenance	of a waste dispos	al record keeping syste	em.		

Activity:	6. Storm water runoff management features								
Impact:	Sedimentation an	Sedimentation and siltation of watercourses							
	Direct Impact: Imp	Direct Impact: Improper or ineffective storm water runoff management features poses a risk of							
	contributing to the	contributing to the sedimentation and siltation of watercourses.							
Significance rating:	Duration	Duration Extent Magnitude Probability Significance							
Pre-Mitigation	4	2	8	5	70				
Post-Mitigation	4	4 1 6 3 33							
Mitigation Measures:	Surface water qual	Surface water quality can be <i>controlled</i> in the following ways:							
	1) Development an	Development and implementation of water quality monitoring plan.							
	(2) Reporting and recording incidents.								
Impact:	Hydrocarbon Con	Hydrocarbon Contamination							
	Direct Impact: St	torm water from	dirty areas such	n as the mining area	a, lay down areas,				
	workshops, stores	, wash bays et	c. poses a risk	to hydrocarbon con	ntaining effluent to				

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contaminate water resources. Depending on the level of contamination the risk may vary from							
insignificant to significant and may affect the surrounding water quality (both surface and sub-							
surface) as well as the soil quality.							
Duration Extent Magnitude Probability Significance							
4 2 8 5 70							
2 1 6 2 18							
Potential impact resulting from hydrocarbon contamination can be controlled in the following							
ways:							
n specifically addressing							
essing the procedure in							
sible reaction to spills o							
accidents as well as addressing remediation procedures.							
(3) Development and implementation of an incident reporting procedure.							
Alteration of drainage patterns							
to the degradation of							
to the degradation c							
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aquatic micro and macr							
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aquatic micro and macro e lines may lead to the nat will affect the surface Significance 60 33							
aquatic micro and macro e lines may lead to the nat will affect the surface Significance 60 33							
aquatic micro and macro e lines may lead to the nat will affect the surface Significance 60 33							

Activity:	8. Pollution Control Dams (PCD's) i.e. Construction and operation
Impact:	Contamination of water resources

	Direct Impact: In	Direct Impact: In the event that PCD's are not constructed in a way to avoid seepage to the							
	surrounding enviro	surrounding environment or if not maintained, it poses a risk of contaminating water resources							
	within close proxim	within close proximity to the facility.							
Significance rating:	Duration Extent Magnitude Probability Significance								
Pre-Mitigation	5 2 8 5 75								
Post-Mitigation	1	1	6	2	16				
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:								
	(1) Development a	nd implementatior	n of a water monite	oring program.					
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan				
	(IWWMP).								
	(3)Development an	nd implementation	of a storm water	management plan.					
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed p	rocedure.				
	(5) Develop and im	(5) Develop and implement an emergency preparedness plan.							
Impact:	Hydrocarbon Con	Hydrocarbon Contamination							
	Direct Impact: Th	ne lack of inspec	tions or regular	maintenance of facili	ties such as water				
	pumps poses a risk	k to contaminating	the surface and s	sub-surface water reso	ource.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	1	6	5	55				
Post-Mitigation	4	1	2	3	21				
Mitigation Measures:	Potential impact re	esulting from hydr	ocarbon contamir	nation can be <i>contro</i>	<i>lled</i> in the following				
	ways:								
	ways.								
		nplement a Hazaro	dous substances	management plan spe	ecifically addressing				
					ecifically addressing				
	(1) Develop and im handling, storage, a	and transport of h	azardous substan		, ,				
	(1) Develop and im handling, storage, at (2) Develop and in	and transport of h	azardous substan ergency response	ces.	ng the procedure in				
	(1) Develop and im handling, storage, at (2) Develop and in	and transport of hamplement an eme	azardous substan ergency response dure should ensur	ces. procedure addressing the fastest possible	ng the procedure in				

Activity:	9.Stores, workshops &wash bays
Impact:	Hydrocarbon Contamination
	Direct Impact: Throughout the construction & operation phase equipment and plant are used.
	This poses a risk of hydrocarbon spills if equipment/plant are not maintained. Depending on the
	size of the spill the level of contamination may vary from insignificant to significant and may
	affect the surrounding water quality (both surface and sub-surface) as well as the soil quality.
	The improper management of oil separators/sumps may also lead to the contamination of the



	surrounding environment.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be controlled in the following						
	ways:						
	(1) Develop and implement a Hazardous substances management plan specifically addressing						
	handling, storage, a	and transport of h	azardous substan	ces.			
	(2) Develop and ir	mplement an eme	ergency response	procedure addressin	g the procedure in		
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or		
	accidents as well as addressing remediation procedures.						
	(3) Development and implementation of an incident reporting procedure.						
Impact:	Contamination of water resources						
	Direct Impact: Imp	proper manageme	nt of effluent from	store, workshops, an	d wash bays poses		
	a high risk to conta	minating water res	sources.				
	-	•		exposure to contamir			
		na and flora hab	itats as well as a	affect the surface and	sub-surface water		
	quality.	,	,	<u>, </u>			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Contamination of w						
	(1) Development a	•					
		and implementation	on of an Integrate	ed Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	•					
	. , .	· ·		ding to a developed pr	ocedure.		
	(5) Develop and im	plement an emer	gency preparedne	ss plan.			

Activity:	10. Ablutions & change house with sewage treatment plant					
Impact:	Contamination of water resources					
	Direct Impact: Improper management of effluent from ablution facilities, change houses, and					
	sewage treatment plant poses a high risk to contaminating water resources.					
	Indirect Impact: 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					



Significance rating:	quality.							
	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:							
	(1) Development a	nd implementatio	n of a water mon	itoring program.				
	(2) Development a	and implementati	on of an Integra	ted Water and Wast	te Management Plar			
	(IWWMP).							
	(3)Development and implementation of a storm water management plan.							
	(4) Reporting and r	(4) Reporting and recording all related incidents according to a developed procedure.						
	(5) Develop and im	plement an emer	gency preparedn	ess plan.				

Activity:	11. Fuel operating power generators							
Impact:	Hydrocarbon Contamination							
	Direct Impact: The	Direct Impact : The construction of improper generator facilities poses a risk of the surrounding						
	environment to b	environment to be exposes to continuous leaking of hydrocarbons leading possibly						
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	ils surrounding the			
	facility.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	<i>led</i> in the following			
	ways:							
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing			
	handling, storage, a	handling, storage, and transport of hazardous substances.						
	(2) Develop and ir	nplement an eme	ergency response	procedure addressing	g the procedure in			
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or			
	accidents as well a	s addressing reme	ediation procedure	es.				
	(3) Development ar	nd implementation	of an incident rep	orting procedure.				
Impact:	Contamination of	water resources						
	Direct Impact: The	e construction of in	mproper generator	r facilities poses a risl	of the surrounding			
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	leading possibly			
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	ils surrounding the			
	facility.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			



Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Contamination of w	Contamination of water resources can be avoided in the following ways:					
	(1) Development ar	(1) Development and implementation of a water monitoring program.					
	(2) Development a	(2) Development and implementation of an Integrated Water and Waste Management Plan					
	(IWWMP).						
	(3)Development an	(3)Development and implementation of a storm water management plan.					
	(4) Reporting and recording all related incidents according to a developed procedure.						
	(5) Develop and im	plement an emerg	gency preparednes	ss plan.			

Activity:	13. Fuel storage					
Impact:	Hydrocarbon Con	Hydrocarbon Contamination				
	Direct Impact: The	Direct Impact: The construction of improper storage facilities poses a risk of the surrounding				
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	leading possibly	
	contaminating surf	ace and sub-surf	face water source	es as well as the so	ils surrounding the	
	facility.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamin	ation can be <i>control</i>	led in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing	
	handling, storage, a	and transport of h	azardous substan	ces.		
	(2) Develop and ir	(2) Develop and implement an emergency response procedure addressing the procedure in				
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing rem	ediation procedure	es.		
	(3) Development ar	nd implementatior	n of an incident rep	orting procedure.		
Impact:	Contamination of	water resources				
	Direct Impact: The	e construction of	improper storage	facilities poses a risk	of the surrounding	
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	leading possibly	
	contaminating surf	ace and sub-surf	face water source	es as well as the so	ils surrounding the	
	facility.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	



Mitigation Measures:	Contamination of water resources can be avoided in the following ways:
	(1) Development and implementation of a water monitoring program.
	(2) Development and implementation of an Integrated Water and Waste Management Plan
	(IWWMP).
	(3)Development and implementation of a storm water management plan.
	(4) Reporting and recording all related incidents according to a developed procedure.
	(5) Develop and implement an emergency preparedness plan.

Activity:	15. Transport of construction material, mobile plant and equipment to the site				te	
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: Th	roughout the co	nstruction phase	construction equipm	nent are used. This	
	poses a risk of hyd	poses a risk of hydrocarbon spills if equipment is not maintained. Depending on the size of the				
	spill the level of co	ontamination may	vary from insigi	nificant to significant	and may affect the	
	surrounding water	quality (both surfa	ce and sub-surfac	ce) as well as the soil	quality.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	1	8	5	50	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamir	nation can be contro	Illed in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances	management plan sp	ecifically addressing	
	handling, storage, a	and transport of ha	azardous substan	ces.		
	(2) Develop and in	nplement an eme	ergency response	procedure addressi	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensu	re the fastest possible	e reaction to spills or	
	accidents as well as	s addressing reme	ediation procedur	es.		
	(3) Development ar	nd implementation	of an incident re	porting procedure.		
Impact:	Sedimentation and	d siltation of wat	ercourses			
	Direct Impact: Co	nstructing access	roads through	drainage lines may o	cause sedimentation	
	and siltation of water	ercourses if not m	anaged properly.			
	Indirect Impact: S	Storm water runo	ff of dirt roads m	nay cause sedimenta	tion and siltation of	
	nearby watercourse	es.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	8	5	60	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Surface water quali	ty can be <i>control</i>	led in the following	g ways:		
	1) Development an	d implementation	of water quality n	nonitoring plan.		



(2) Reporting and recording incidents.

Activity:	16. Use of existing	drilled / new bore	holes		
Impact:	Hydrocarbon Con	tamination			
	Direct Impact: Th	ne lack of inspec	tions or regular	maintenance of facili	ities such as water
	pumps poses a risk	to contaminating	the surface and s	sub-surface water res	ource.
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	8	5	50
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamir	nation can be <i>contro</i>	<i>lled</i> in the following
	ways:				
	(1) Develop and im	plement a Hazaro	dous substances	management plan sp	ecifically addressing
	handling, storage,	and transport of h	azardous substan	ces.	
	(2) Develop and ir	mplement an eme	ergency response	procedure addressir	ng the procedure in
	case of a chemical	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or			
	accidents as well as addressing remediation procedures.				
	(3) Development a	(3) Development and implementation of an incident reporting procedure.			
Impact:	Water level reduc	tion and contami	nation		
	Direct Impact: In	nproper managei	ment of borehole	es i.e. Pumping rate	es exceeding yield
	thresholds poses a	risk to boreholes	being pumped dry	/ .	
	Indirect Impact: E	xposed boreholes	s may result in bo	th sub-surface and s	urface water quality
	to be affected. Ove	er exposing for an	extended time n	nay lead to water sho	rtages and poses a
	negative effect to the	ne downstream us	sers.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the	surface water quality	can be <i>controlled</i>
	in following ways:				
	(1) Development a	nd implementation	of water quality r	monitoring plan.	
	(2) Development of	f a storm water ma	anagement plan.		
	(3) Reporting and r	ecording incidents	S.		
	(4) Create awarene	ess of water conse	ervation.		

Aspect:	Ground Water Quality



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Activity:	1. Access and haul	Access and hauling along roads i.e. during the construction of roads				
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: Th	roughout the co	nstruction phase	construction equipme	ent are used. This	
	poses a risk of hyd	rocarbon spills if	equipment is not i	maintained. Dependin	g on the size of the	
	spill the level of co	ontamination may	vary from insigr	nificant to significant	and may affect the	
	surrounding water	quality (both surfa	ce and sub-surfac	e) as well as the soil	quality.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	1	6	4	32	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be control	lled in the following	
	ways:					
	(1) Develop and implement a Hazardous substances management plan specifically addressing				ecifically addressing	
	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	(2) Develop and implement an emergency response procedure addressing the procedure in				
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well a	s addressing reme	ediation procedure	es.		
	(3) Development ar	nd implementation	of an incident rep	oorting procedure.		

Activity:	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure				
Impact:	Hydrocarbon Con	Hydrocarbon Contamination			
	Direct Impact: Th	roughout the co	nstruction phase	construction equipm	nent are used. This
	poses a risk of hyd	rocarbon spills if	equipment is not	maintained. Dependir	ng on the size of the
	spill the level of co	ontamination may	vary from insig	nificant to significant	and may affect the
	surrounding water	quality (both surfa	ce and sub-surfa	ce) as well as the soil	quality.
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	1	6	4	36
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be controlled in the following			
	ways:	ways:			
	(1) Develop and implement a Hazardous substances management plan specifically addressing				ecifically addressing
	handling, storage, a	and transport of h	azardous substar	nces.	
	(2) Develop and ir	nplement an eme	ergency response	e procedure addressi	ng the procedure in
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or				
	accidents as well a	s addressing rem	ediation procedur	es.	
	(3) Development ar	nd implementatior	n of an incident re	eporting procedure.	

Impact:	Water level reduct	Water level reduction and contamination				
	Direct Impact: The	e reduction in wa	ater levels as we	II as contamination of	the water resource	
	that may be cause	ed by alternating	the topography	during site clearing a	nd topsoil stripping	
	poses a risk to affe	ecting the surface	and sub-surface	e water quality as well	as the downstream	
	users.	users.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	1	6	5	45	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Water level reduct	ion and contamin	ation affecting the	e surface water quality	can be <i>controlled</i>	
	in following ways:	in following ways:				
	(1) Development and implementation of water quality monitoring plan.					
	(2) Development of a storm water management plan.					
	(3) Reporting and r	(3) Reporting and recording incidents.				
	(4) Create awarene	ess of water cons	ervation.			

Activity:	3. Weigh bridge	3. Weigh bridge			
Impact:	Hydrocarbon Con	tamination			
	Direct Impact: Thr	oughout the oper	ational phase hau	ıling vehicles poses a	risk of hydrocarbon
	spills if not maintai	ned. Depending o	on the size of the	spill the level of conta	amination may vary
	from insignificant to	significant and r	may affect the sur	rrounding water qualit	y (both surface and
	sub-surface) as we	ll as the soil quali	ty.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	1	4	3	24
Post-Mitigation	1	1	4	2	12
Mitigation Measures:	Potential impact re	esulting from hydr	ocarbon contamii	nation can be <i>contro</i>	Iled in the following
	ways:				
	(1) Develop and implement a Hazardous substances management plan specifically addressing				
	handling, storage, a	and transport of h	azardous substan	ces.	
	(2) Develop and ir	(2) Develop and implement an emergency response procedure addressing the procedure in			
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or				
	accidents as well a	s addressing rem	ediation procedure	es.	
	(3) Development ar	nd implementatior	n of an incident re	porting procedure.	

Activity:	6. Storm water runoff management features
Impact:	Hydrocarbon Contamination

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	Direct Impact: St	Direct Impact: Storm water from dirty areas such as the mining area, lay down areas,				
	workshops, stores	workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to				
	contaminate water	resources. Depe	ending on the leve	el of contamination the	e risk may vary from	
	insignificant to sigr	nificant and may	affect the surroun	ding water quality (bo	th surface and sub-	
	surface) as well as	the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	4	56	
Post-Mitigation	2	1	4	2	14	
Mitigation Measures:	Potential impact re	esulting from hyd	Irocarbon contam	ination can be <i>contro</i>	Iled in the following	
	ways:					
	(1) Develop and im	plement a Haza	rdous substances	management plan sp	ecifically addressing	
	handling, storage, and transport of hazardous substances.					
	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well a	s addressing ren	nediation procedu	es.		
	(3) Development a	nd implementatio	n of an incident re	porting procedure.		

Activity:	8. Pollution Control	8. Pollution Control Dams (PCD's) i.e. Construction and operation					
Impact:	Contamination of	Contamination of water resources					
	Direct Impact: In t	Direct Impact: In the event that PCD's are not constructed in a way to avoid seepage to the					
	surrounding environ	nment or if not m	naintained, it pose	es a risk of contamina	ting water resources		
	within close proxim	within close proximity to the facility.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	5	2	8	5	75		
Post-Mitigation	1	1	6	2	16		
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:						
	(1) Development ar	(1) Development and implementation of a water monitoring program.					
	(2) Development a	(2) Development and implementation of an Integrated Water and Waste Management Plan					
	(IWWMP).	(IWWMP).					
	(3)Development an	d implementation	n of a storm water	management plan.			
	(4) Reporting and r	ecording all relate	ed incidents acco	rding to a developed p	procedure.		
	(5) Develop and im	plement an emer	gency preparedn	ess plan.			
Impact:	Hydrocarbon Con	tamination i.e. l	Jsage of diesel of	perating pumps			
	Direct Impact: Th	e lack of inspe	ctions or regular	maintenance of facil	lities such as water		
	pumps poses a risk	to contaminating	g the surface and	sub-surface water res	ource.		



Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	6	3	33		
Post-Mitigation	4	1	6	1	11		
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following					
	ways:	ways:					
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing					
	handling, storage,	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or						
	accidents as well as addressing remediation procedures.						
	(3) Development a	nd implementation	on of an incident r	eporting procedure.			

Activity:	9.Stores, workshops &wash bays				
Impact:	Hydrocarbon Contamination				
	Direct Impact: Thr	Direct Impact: Throughout the construction & operation phase equipment and plant are used.			
	This poses a risk of	f hydrocarbon spil	Is if equipment/pl	ant are not maintaine	d. Depending on the
	size of the spill the	e level of contam	ination may vary	from insignificant to	significant and may
	affect the surround	ing water quality	(both surface and	d sub-surface) as wel	I as the soil quality.
	The improper mana	agement of oil se	parators/sumps n	nay also lead to the o	contamination of the
	surrounding enviror	nment.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	2	22
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following				
	ways:	ways:			
	(1) Develop and implement a Hazardous substances management plan specifically addressing				
	handling, storage, and transport of hazardous substances.				
	(2) Develop and implement an emergency response procedure addressing the procedure in				
	case of a chemical	spill. This proced	dure should ensu	re the fastest possible	reaction to spills or
	accidents as well as	s addressing remo	ediation procedur	es.	
	(3) Development ar	nd implementation	of an incident re	porting procedure.	
Impact:	Contamination of	Contamination of water resources			
	Direct Impact: Imp	Direct Impact: Improper management of effluent from store, workshops, and wash bays poses			
	a high risk to conta	minating water re	sources.		
	Indirect Impact: O	ver an extended _l	period of time the	exposure to contamin	nation will cause the

	degradation of fauna and flora habitats as well as affect the surface and sub-surface water quality.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	2	22		
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:						
	(1) Development and implementation of a water monitoring program.						
	(2) Development and implementation of an Integrated Water and Waste Management Plan						
	(IWWMP).						
	(3)Development an	(3)Development and implementation of a storm water management plan.					
	(4) Reporting and r	(4) Reporting and recording all related incidents according to a developed procedure.					
	(5) Develop and im	plement an em	ergency preparedr	ness plan.			

Activity:	10. Ablutions & change house with sewage treatment plant					
Impact:	Contamination of	Contamination of water resources				
	Direct Impact: Imp	Direct Impact: Improper management of effluent from ablution facilities, change houses, and				
	sewage treatment	olant poses a hig	h risk to contamir	ating water resources.		
	Indirect Impact: O	ver an extended	period of time the	e exposure to contamir	nation will cause the	
	degradation of fau	na and flora hat	oitats as well as	affect the surface and	l sub-surface water	
	quality.	quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	4	56	
Post-Mitigation	4	1	6	2	22	
Mitigation Measures:	Contamination of w	ater resources ca	an be avoided in	the following ways:		
	(1) Development ar	(1) Development and implementation of a water monitoring program.				
	(2) Development a	(2) Development and implementation of an Integrated Water and Waste Management Plan				
	(IWWMP).	(IWWMP).				
	(3)Development an	(3)Development and implementation of a storm water management plan.				
	(4) Reporting and r	ecording all relate	ed incidents acco	rding to a developed p	rocedure.	
	(5) Develop and im	plement an emer	gency preparedn	ess plan.		

Activity:	11. Fuel operating power generators
Impact:	Hydrocarbon Contamination

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	Direct Impact: The	e construction of in	mproper generato	r facilities poses a risl	k of the surrounding	
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	leading possibly	
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	ils surrounding the	
	facility.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	2	22	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamin	ation can be <i>control</i>	led in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressino	
	handling, storage, a	and transport of h	azardous substan	ces.		
	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills o					
	accidents as well as addressing remediation procedures. (3) Development and implementation of an incident reporting procedure.					
Impact:	Contamination of	Contamination of water resources				
	Direct Impact: The	e construction of in	mproper generato	r facilities poses a risl	k of the surrounding	
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	leading possibly	
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	ils surrounding the	
	facility.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	4	56	
Post-Mitigation	4	1	6	2	22	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:		
	(1) Development a	nd implementatior	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water r	management plan.		
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed pr	rocedure.	
	(5) Develop and implement an emergency preparedness plan.					

Activity:	13. Fuel storage

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Impact:	Hydrocarbon Con	tamination					
		Direct Impact: The construction of improper storage facilities poses a risk of the surrounding					
	· -			ng of hydrocarbons	· ·		
		•			•		
	contaminating surface and sub-surface water sources as well as the soils surrounding the facility.						
Significance rating:	Duration	·					
	4	2	8	5	70		
Pre-Mitigation			6	2			
Post-Mitigation	4	1	_		22		
Mitigation Measures:		sulting from hydr	ocarbon contamin	ation can be <i>contro</i>	<i>lied</i> in the following		
	ways:						
	. ,	•		management plan sp	ecifically addressing		
		handling, storage, and transport of hazardous substances.					
	(2) Develop and implement an emergency response procedure addressing the procedure in						
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or						
		accidents as well as addressing remediation procedures.					
	(3) Development a	(3) Development and implementation of an incident reporting procedure.					
Impact:	Contamination of	water resources					
	Direct Impact: The	e construction of	improper storage	facilities poses a risk	of the surrounding		
	environment to b	pe exposes to	continuous leaki	ng of hydrocarbons	s leading possibly		
	contaminating surf	ace and sub-sur	face water source	es as well as the so	oils surrounding the		
	facility.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	4	56		
Post-Mitigation	4	1	6	2	22		
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:			
	(1) Development a	nd implementatior	n of a water monito	oring program.			
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	d implementation	of a storm water r	management plan.			
	(4) Reporting and r	ecording all relate	ed incidents accord	ling to a developed p	rocedure.		
	(5) Develop and im	plement an emer	gency preparedne	ss plan.			

Activity:	15. Transport of construction material, mobile plant and equipment to the site
Activity:	15. I ransport of construction material, mobile plant and equipment to the site

Impact:	Hydrocarbon Con	Hydrocarbon Contamination					
	Direct Impact: Th	Direct Impact: Throughout the construction phase construction equipment are used. This					
	poses a risk of hyd	drocarbon spills i	if equipment are	not maintained. Deper	nding on the size of		
	the spill the level o	f contamination r	may vary from ins	significant to significant	t and may affect the		
	surrounding water	quality (both surfa	ace and sub-surfa	ace) as well as the soil	quality.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	8	5	50		
Post-Mitigation	1	1	4	2	12		
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following					
	ways:	ways:					
	(1) Develop and implement a Hazardous substances management plan specifically addressing						
	handling, storage, a	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well a	s addressing rem	nediation procedu	res.			
	(3) Development ar	nd implementatio	n of an incident re	eporting procedure.			

Hydrocarbon Conf	tamination			
	ammation			
Direct Impact: Th	e lack of inspe	ctions or regular	maintenance of fac	cilities such as water
oumps poses a risk	to contaminating	g the surface and	sub-surface water re	esource.
Duration	Extent	Magnitude	Probability	Significance
1	2	6	5	45
4	1	4	2	18
Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following				
ways:				
(1) Develop and im	plement a Hazar	dous substances	management plan s	specifically addressing
handling, storage, and transport of hazardous substances.				
(2) Develop and implement an emergency response procedure addressing the procedure in				sing the procedure in
case of a chemical	spill. This proce	dure should ensu	ure the fastest possib	ole reaction to spills or
accidents as well as	s addressing rem	nediation procedu	res.	
(3) Development ar	nd implementatio	n of an incident re	eporting procedure.	
Nater level reduct	ion and contam	ination		
Direct Impact: Im	nproper manage	ement of boreho	les i.e. Pumping r	ates exceeding yield
hresholds poses a	risk to boreholes	being pumped d	ry.	
	Potential impact revays: 1) Develop and impact impacting, storage, and incidents as well as 3) Development ar ar avater level reduct Direct Impact: I	Duration Extent 1 2 4 1 Potential impact resulting from hydivays: 1) Develop and implement a Hazar andling, storage, and transport of hease of a chemical spill. This process accidents as well as addressing remission Development and implementation and contamination of the process of the contamination of the process of the contamination of th	Duration Extent Magnitude 1 2 6 4 1 4 Potential impact resulting from hydrocarbon contaminating, storage, and transport of hazardous substances and implement an emergency responsivase of a chemical spill. This procedure should ensure accidents as well as addressing remediation procedured in Development and implementation of an incident responsivate of the procedure and implementation of an incident responsivate of the procedure and implementation of an incident responsive to the procedure and implementation of an incident responsive to the procedure and implementation of an incident responsive to the procedure and implementation of an incident responsive to the procedure and implementation of an incident responsive to the procedure and implementation of an incident responsive to the procedure and the procedure	1 2 6 5 4 1 4 2 Potential impact resulting from hydrocarbon contamination can be <i>cont</i> ways: 1) Develop and implement a Hazardous substances management plans and ling, storage, and transport of hazardous substances. 2) Develop and implement an emergency response procedure address asse of a chemical spill. This procedure should ensure the fastest possible accidents as well as addressing remediation procedures. 3) Development and implementation of an incident reporting procedure.

Aspect:

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

DMR REF: LP 30/5/1/2/3/2/1 (10104)

	Indirect Impact: Exposed boreholes may result in both sub-surface and surface water quality to be affected. Over exposing for an extended time may lead to water shortages and poses a								
	negative effect to the			,	nonagos ama posso a				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	2	6	5	60				
Post-Mitigation	4	4 1 4 3 27							
Mitigation Measures:	Water level reduction and contamination affecting the surface water quality can be controlled								
	in following ways:								
	(1) Development and implementation of water quality monitoring plan.								
	(2) Development of a storm water management plan.								
	(3) Reporting and r	(3) Reporting and recording incidents.							
	(4) Create awarene	ess of water con	servation.						

Wetlands and Aquatic Ecology

Activity:	1. Access and haul	ing along roads i.	e. during the cons	truction of roads			
Impact:	Sedimentation and	d siltation of wat	ercourses				
	Direct Impact: Co	onstructing access	s roads through o	drainage lines may ca	ause sedimentation		
	and siltation of water	ercourses if not m	anaged properly.				
	Indirect Impact: S	Storm water runo	ff of dirt roads m	ay cause sedimentat	tion and siltation of		
	nearby watercourse	es.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	2	6	5	45		
Post-Mitigation	4	1	4	2	18		
Mitigation Measures:	Surface water qual	ity can be <i>contro</i>	lled in the followin	g ways:			
	1) Development an	d implementation	of water quality m	onitoring plan.			
	(2) Reporting and r	(2) Reporting and recording incidents.					
Impact:	Alteration of drainage patterns						
	Indirect Impact:	Alteration of the	e drainage patte	erns may lead to t	he degradation of		
	downstream or sur	rounding Wetland	ls which in its turn	may affect the aquat	tic micro and macro		
	ecology.						
	Direct Impact: The construction of access roads through drainage lines may lead to the						
	siltation of streams	as well as lead t	to erosion along t	he river banks that wi	III affect the surface		
	water quality negatively.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		



Pre-Mitigation	4	2	6	5	60				
Post-Mitigation	4	1	4	3	27				
Mitigation Measures:	The effects on surface water quality resulting from the alteration in drainage patterns can be								
	remedied in the fol	remedied in the following ways:							
	(1) Develop a wate	r monitoring mana	agement plan.						
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.					
	(3) Develop a reha	abilitation plan spe	ecifically addressi	ng the rehabilitation	measures related to				
	reinstatement of dr	ainage lines.							
Impact:	Destruction of up	stream tributarie	s and reduction	in water in the catch	nment				
	Indirect Impact: /	Alteration of the	upstream drainag	e lines may lead to	the degradation of				
	downstream or sur	rounding Wetland	s which in its turr	may affect the aqua	tic micro and macro				
	ecology.								
	Direct Impact: The	e destruction of tri	butaries may lead	to a limited volume	of water available to				
	the downstream us	sers. The reductio	n in water in the	catchment may caus	e the degradation of				
	surface water quali	ty.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	2	6	5	60				
Post-Mitigation	4	1	4	3	27				
Mitigation Measures:	The effects on surf	face water quality	resulting from th	e destruction of upst	ream tributaries and				
	reduction in water i	n the catchment of	an be <i>remedied</i>	n the following ways:					
	(1) Develop a wate	r monitoring mana	igement plan.						
	(2) Record and report all incidents related to affecting water quality.								
	` '	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to							
	` ′	abilitation plan spe	ecifically addressi		measures related to				

Activity:	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure							
Impact:	Destruction of Wetlands							
	Direct Impact: Site	Direct Impact: Site clearing and topsoil stripping in Wetlands will cause the loss of micro and						
	macro aquatic species.							
Significance rating:	Duration Extent Magnitude Probability Significance							
Pre-Mitigation	3	2	8	5	65			
Post-Mitigation	2 1 6 4 36							
Mitigation Measures:	The potential effects may be avoided in the following ways:							
	(1) Develop a water monitoring management plan.							
	(2) Record and rep	ort all incidents re	elated to affecting	water quality.				

Environmental Manu	,							
	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to							
	reinstatement of wetlands.							
Impact:	Hydrocarbon Con	tamination						
	Direct Impact: Th	roughout the co	nstruction phase	construction equipme	ent are used. This			
	poses a risk of hyd	rocarbon spills if	equipment is not r	maintained. Dependin	g on the size of the			
	spill the level of co	ontamination may	vary from insign	nificant to significant	and may affect the			
	surrounding water	quality (both surfa	ce and sub-surfac	e) as well as the soil	quality.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	2	1	6	5	45			
Post-Mitigation	1	1	6	4	32			
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	led in the following			
	ways:							
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing			
	handling, storage, a	and transport of h	azardous substan	ces.				
	(2) Develop and ir	nplement an eme	ergency response	procedure addressing	g the procedure in			
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or			
	accidents as well a	accidents as well as addressing remediation procedures.						
	(3) Development and implementation of an incident reporting procedure.							
Impact:		Sedimentation and siltation of watercourses						
	-	•	·	wn areas through or i				
				of watercourses if not				
	Indirect Impact: Storm water runoff of dirt roads and un-vegetated areas may cause							
	sedimentation and		7					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	3	1	6	5	50			
Post-Mitigation		3 1 6 5 50						
Mitigation Measures:	Surface water qual	•		•				
	1) Development and implementation of water quality monitoring plan.							
	(2) Reporting and r		S. 					
Impact:	Alteration of drain	• .						
	-		• .	erns may lead to t	•			
		rounding Wetland	s which in its turn	may affect the aquai	ic micro and macro			
	ecology.	ta alaa ta aa ta aa ta aa		harranta III. P				
	-	•		hrough drainage line	•			
	siltation of streams	as well as lead t	o erosion along th	ne river banks that wi	II affect the surface			



Environmnetal Impact Assessment Report and Environmental Management Programme report for The Spitsvale Mining Right Application and Associated Activities

	water quality negatively.									
Significance rating:	Duration	Duration Extent Magnitude Probability Significance								
Pre-Mitigation	1	2	6	5	45					
Post-Mitigation	4	1	4	2	18					
Mitigation Measures:	The effects on surface water quality resulting from the alteration in drainage patterns can be									
	remedied in the following ways:									
	(1) Develop a water monitoring management plan.									
	(2) Record and report all incidents related to affecting water quality.									
	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to									
	reinstatement of dr	ainage lines.								

Activity:	6. Storm water runoff management features								
Impact:	Sedimentation an	d siltation of wat	ercourses						
	Direct Impact: Imp	proper or ineffective	ve storm water ru	noff management feat	ures poses a risk of				
	contributing to the	sedimentation and	d siltation of water	courses.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance							
Pre-Mitigation	4	2	8	5	70				
Post-Mitigation	4	2	6	3	36				
Mitigation Measures:	Surface water qual	ity can be <i>contro</i>	fled in the following	ng ways:					
	1) Development an	d implementation	of water quality r	nonitoring plan.					
	(2) Reporting and r	ecording incidents	S.						
Impact:	Hydrocarbon Con	tamination							
	Direct Impact: St	orm water from	dirty areas such	n as the mining area	a, lay down areas,				
	workshops, stores	workshops, stores, wash bays etc. poses a risk to hydrocarbon containing effluent to							
	contaminate water resources. Depending on the level of contamination the risk may vary from								
	insignificant to sigr	nificant and may a	affect the surroun	ding water quality (bo	th surface and sub-				
	surface) as well as	the soil quality.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	2	8	5	70				
Post-Mitigation	4	4 1 6 3 33							
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contami	nation can be <i>contro</i>	Iled in the following				
	ways:								
	(1) Develop and im	plement a Hazar	dous substances	management plan spe	ecifically addressing				
	handling, storage,	and transport of h	azardous substar	nces.					
	(2) Develop and ir	mplement an eme	ergency response	e procedure addressir	ng the procedure in				

	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or						
	accidents as well as addressing remediation procedures.						
	(3) Development a	nd implementatior	n of an incident re	porting procedure.			
Impact:	Alteration of drain	nage patterns					
	Indirect Impact:	Alteration of the	e drainage patt	erns may lead to t	the degradation of		
	downstream or sur	rounding Wetland	ls which in its tur	n may affect the aqua	tic micro and macro		
	ecology.						
	Direct Impact: Si	te clearing and t	topsoil stripping	through drainage line	es may lead to the		
	siltation of streams as well as lead to erosion along the river banks that will affect the surface						
	water quality negat	ively.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	The effects on surface water quality resulting from the alteration in drainage patterns can be						
	remedied in the following ways:						
	(1) Develop a wate	(1) Develop a water monitoring management plan.					
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.			
	(3) Develop a reha	abilitation plan spo	ecifically address	ing the rehabilitation r	measures related to		
	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to reinstatement of drainage lines.						

Activity:	8. Pollution Control Dams (PCD's) i.e. Construction and operation					
Impact:	Contamination of	water resources				
	Direct Impact: In	the event that PC	D's are not const	tructed in a way to av	oid seepage to the	
	surrounding enviro	nment or if not ma	aintained, it poses	s a risk of contaminati	ng water resources	
	within close proxim	ity to the facility.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	8	4	60	
Post-Mitigation	1	1	6	2	16	
Mitigation Measures:	Contamination of w	ater resources ca	in be avoided in t	he following ways:		
	(1) Development ar	nd implementatior	n of a water monito	oring program.		
	(2) Development and implementation of an Integrated Water and Waste Management Plan					
	(IWWMP).					
	(3)Development and implementation of a storm water management plan.					
	(4) Reporting and r	ecording all relate	ed incidents accord	ding to a developed pr	ocedure.	
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.		



Activity:	9.Stores, workshops &wash bays					
Impact:	Contamination of	water resources				
	Direct Impact: Imp	oroper manageme	ent of effluent fron	n store, workshops, an	nd wash bays poses	
	a high risk to contai	minating water re	sources.			
	Indirect Impact: O	ver an extended	period of time the	exposure to contamin	nation will cause the	
	degradation of fau	na and flora hab	itats as well as a	affect the surface and	l sub-surface water	
	quality.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	the following ways:		
	(1) Development ar	nd implementation	n of a water monit	oring program.		
	(2) Development a	and implementation	on of an Integrat	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water	management plan.		
	(3)Development and implementation of a storm water management plan.					
	(4) Reporting and re	ecording all relate	ed incidents accor	ding to a developed pr	ocedure.	

Activity:	10. Ablutions & change house with sewage treatment plant					
Impact:	Contamination of	water resources				
	Direct Impact: Imp	oroper manageme	ent of effluent fror	n ablution facilities, c	hange houses, and	
	sewage treatment p	olant poses a high	risk to contamina	ting water resources.		
	Indirect Impact: O	ver an extended ¡	period of time the	exposure to contamir	nation will cause the	
	degradation of fau	na and flora hab	itats as well as a	ffect the surface and	I sub-surface water	
	quality.					
Significance rating:	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Contamination of w	ater resources ca	in be avoided in th	ne following ways:		
	(1) Development ar	nd implementation	n of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water r	management plan.		
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed pr	ocedure.	

Activity:	11. Fuel operating	11. Fuel operating power generators					
Impact:	Contamination of	water resources	;				
	Direct Impact: The	e construction of i	mproper generato	r facilities poses a risl	c of the surrounding		
	environment to b	e exposes to	continuous leaki	ing of hydrocarbons	leading possibly		
	contaminating surf	ace and sub-sur	face water source	es as well as the so	ils surrounding the		
	facility.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Contamination of w	ater resources ca	an be avoided in t	he following ways:			
	(1) Development ar	nd implementatior	n of a water monit	oring program.			
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	d implementation	of a storm water	management plan.			
	(4) Reporting and r	ecording all relate	ed incidents accor	ding to a developed p	ocedure.		
	(5) Develop and im	plement an emerg	gency preparedne	ess plan.			

Activity:	13. Fuel storage							
Impact:	Contamination of	Contamination of water resources						
	Direct Impact: The	e construction of	improper storage	facilities poses a risk	of the surrounding			
	environment to b	e exposes to	continuous leakii	ng of hydrocarbons	leading possibly			
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	ils surrounding the			
	facility.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:				
	(1) Development a	nd implementation	of a water monito	oring program.				
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan			
	(IWWMP).							
	(3)Development an	d implementation	of a storm water r	management plan.				
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed p	ocedure.			
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.				

Activity:	15. Transport of construction material, mobile plant and equipment to the site
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Aspect:

Environmental Impact Assessment Report and Environmental Management Programme report for The Spitsvale Mining Right Application and Associated Activities DMR ref: LP 30/5/1/2/3/2/1 (10104)

Impact:	Sedimentation and siltation of watercourses							
	Direct Impact: Co	Direct Impact: Constructing access roads through drainage lines may cause sedimentation						
	and siltation of wat	ercourses if not m	nanaged properly.					
	Indirect Impact: S	Storm water rund	off of dirt roads n	nay cause sedimenta	tion and siltation of			
	nearby watercourse	es.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	2	2	8	5	60			
Post-Mitigation	1	1	6	3	24			
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:							
	1) Development and implementation of water quality monitoring plan.							
	(2) Reporting and r	ecording incident	S.					

Water resource users and management

Activity:	. Access and haulir	ng along roads i.e.	during the constr	uction of roads		
Impact:	Destruction of up	stream tributarie	s and reduction i	n water in the catch	ment	
	Indirect Impact: /	Alteration of the u	upstream drainag	e lines may lead to	the degradation of	
	downstream or sur	rounding Wetland	s which in its turn	may affect the aquat	tic micro and macro	
	ecology.					
	Direct Impact: The	e destruction of tri	butaries may lead	to a limited volume of	of water available to	
	the downstream us	ers. The reductio	n in water in the o	catchment may cause	the degradation of	
	surface water quali	ty.				
ce rating:	Duration	Extent	Magnitude	Probability	Significance	
n	3	2	6	4	44	
on	1	1	6	3	24	
leasures:	The effects on surf	face water quality	resulting from the	e destruction of upstr	eam tributaries and	
	reduction in water i	n the catchment c	an be remedied i	n the following ways:		
	(1) Develop a wate	r monitoring mana	igement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting v	vater quality.		
	(3) Develop a reha	abilitation plan spe	ecifically addressing	ng the rehabilitation r	neasures related to	
	reinstatement of drainage lines.					
Impact:	Water usage for dust suppression - Wastage of water resource					
	Direct Impact: Improper management of the water used during dust suppression may lead to					
	the wastage of the	available water re	source.			
ce rating:	Duration	Extent	Magnitude	Probability	Significance	
	ce rating: on ion fleasures:	Impact: Destruction of upper Indirect Impact: Adownstream or sure ecology. Direct Impact: The the downstream us surface water qualified on a surface water qual	Impact: Destruction of upstream tributaries Indirect Impact: Alteration of the downstream or surrounding Wetland ecology. Direct Impact: The destruction of tri the downstream users. The reduction surface water quality. Duration Extent On 3 2 Ion 1 The effects on surface water quality reduction in water in the catchment of (1) Develop a water monitoring mana (2) Record and report all incidents re (3) Develop a rehabilitation plan specific reinstatement of drainage lines. Impact: Water usage for dust suppression Direct Impact: Improper management the wastage of the available water resistance.	Impact: Destruction of upstream tributaries and reduction is Indirect Impact: Alteration of the upstream drainage downstream or surrounding Wetlands which in its turn ecology. Direct Impact: The destruction of tributaries may lead the downstream users. The reduction in water in the consurface water quality. Duration Extent Magnitude on 3 2 6 ion 1 1 6 Measures: The effects on surface water quality resulting from the reduction in water in the catchment can be remedied in (1) Develop a water monitoring management plan. (2) Record and report all incidents related to affecting with the catchment of drainage lines. Impact: Water usage for dust suppression - Wastage of water usage of the available water resource.	Impact: Destruction of upstream tributaries and reduction in water in the catch Indirect Impact: Alteration of the upstream drainage lines may lead to downstream or surrounding Wetlands which in its turn may affect the aquate ecology. Direct Impact: The destruction of tributaries may lead to a limited volume of the downstream users. The reduction in water in the catchment may cause surface water quality. Duration Extent Magnitude Probability on 3 2 6 4 ion 1 1 6 3 Measures: The effects on surface water quality resulting from the destruction of upstread reduction in water in the catchment can be remedied in the following ways: (1) Develop a water monitoring management plan. (2) Record and report all incidents related to affecting water quality. (3) Develop a rehabilitation plan specifically addressing the rehabilitation reinstatement of drainage lines. Impact: Water usage for dust suppression - Wastage of water resource Direct Impact: Improper management of the water used during dust suppression the d	



Pre-Mitigation	1	2	4	5	35		
Post-Mitigation	1	1	4	3	18		
Mitigation Measures:	The following mit	igation measures	can be implem	ented to control th	ne usage of water		
	resources:						
	(1) Water usage monitoring plan to be developed and implemented.						
	(2) Create awarene	ess of water conse	ervation.				

Activity:	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure					
Impact:	Water level reduct	tion and contami	nation			
	Direct Impact: The	e reduction in wa	ter levels as well	I as contamination of	the water resource	
	that may be cause	ed by alternating	the topography	during site clearing a	nd topsoil stripping	
	poses a risk to affe	ecting the surface	and sub-surface	water quality as well	as the downstream	
	users.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	6	5	50	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the	surface water quality of	can be <i>controlled</i>	
	in following ways:					
	(1) Development and implementation of water quality monitoring plan.					
	(2) Development of a storm water management plan.					
	(3) Reporting and re	ecording incidents	S.			
	(4) Create awarene	ess of water conse	ervation.			

Activity:	4. Onsite Clinic						
Impact:	Domestic water us	sage - Wastage o	of water resource	,			
	Direct Impact: Th	Direct Impact: The lack of water management and maintenance of taps, toilets, basins etc.					
	poses a risk to was	tage of water.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	1	2	5	35		
Post-Mitigation	4 1 2 3 21						
Mitigation Measures:	The following mitigation measures can be implemented to avoid the usage of water resources:						
	(1) Water usage monitoring plan to be developed and implemented.						
	(2) Create awarene	ess of water conse	ervation.				

Activity: 5. Mining offices (construction and operation) i.e. operation of training centres, offices and

	kitchen facilities							
Impact:		Domestic water usage - Wastage of water resource						
	Direct Impact: Th	e lack of water n	nanagement and	maintenance of taps,	toilets, basins etc.			
	poses a risk to was	tage of water.						
Significance rating:	Duration	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	4	1	4	5	45			
Post-Mitigation	4	4 1 2 3 21						
Mitigation Measures:	The following mitigation measures can be implemented to avoid the usage of water resources:							
	(1) Water usage mo	(1) Water usage monitoring plan to be developed and implemented.						
	(2) Create awarene	ess of water conse	ervation.					

Activity:	7. Water storage facilities						
Impact:	Improper water st	orage managem	ent				
	Direct Impact: Imp	Direct Impact: Improper management of water storage facilities i.e. Not inspecting or regularly					
	maintaining the sto	rage tanks pose a	a risk of leaks and	contamination.			
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	1	6	4	44		
Post-Mitigation	4	4 1 2 3 21					
Mitigation Measures:	The following mitigation measures can be implemented to avoid the usage of water resources:						
	(1) Water usage monitoring plan to be developed and implemented.						
	(2) Create awarene	ess of water conse	ervation.				

Activity:	16. Use of existing drilled / new boreholes						
Impact:	Water level reduc	Water level reduction and contamination					
	Direct Impact: Ir	Direct Impact: Improper management of boreholes i.e. Pumping rates exceeding yield					
	thresholds poses a	risk to boreholes	s being pumped d	ry.			
	Indirect Impact: E	Exposed borehole	es may result in b	ooth sub-surface an	d surface water quality		
	to be affected. Ove	er exposing for a	in extended time	may lead to water s	shortages and poses a		
	negative effect to the	negative effect to the downstream users.					
Significance rating:	Duration Extent Magnitude Probability Significance						
9							
Pre-Mitigation	4	2	6	5	60		
	4	2 2	6 2	5 3	60 24		
Pre-Mitigation	4	2	2	3			
Pre-Mitigation Post-Mitigation	4	2	2	3	24		



(2) Development of a storm water management plan.
(3) Reporting and recording incidents.
(4) Create awareness of water conservation.

Aspect:	Soil Quality
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Activity:	1. Access and haul	Access and hauling along roads i.e. during the construction of roads				
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: Th	Direct Impact: Throughout the construction phase construction equipment are used. This				
	poses a risk of hyd	drocarbon spills if	equipment are no	ot maintained. Depen	iding on the size of	
	the spill the level of	f contamination m	nay vary from insig	gnificant to significant	and may affect the	
	surrounding water	quality (both surfa	ce and sub-surfac	e) as well as the soil	quality.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	1	6	4	36	
Post-Mitigation	4	2	2	3	24	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	led in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing	
	handling, storage, a	and transport of ha	azardous substand	ces.		
	(2) Develop and in	nplement an eme	ergency response	procedure addressin	g the procedure in	
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or	
	accidents as well as	s addressing reme	ediation procedure	es.		
	(3) Development ar	nd implementation	of an incident rep	orting procedure.		
Impact:	Degradation of so	il resources				
	Direct Impact: As	part of the const	truction activity re	lated to roads, valua	ble topsoil's will be	
	removed. Improper	management of	topsoil or fertile	soil may cause the	loss of flora micro-	
	ecosystems and ca	use the degradati	on of soil quality.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	1	6	5	40	
Post-Mitigation	4	2	2	3	24	
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:		
	(1) Develop and im	plement soil cons	ervation and stock	xpile management pla	n.	
	(2) Develop and implement a Rehabilitation plan.					
Impact:	Erosion – Loss of	fertile soil				
	Indirect Impact: Improper management of storm water may lead to erosion along the access					



	routes. This may lead to the loss of fertile soil and in its turn affect the micro-ecosystems of the surrounding environment.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	1	6	5	45		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Erosion can be cor	ntrolled in the fo	ollowing ways:	1			
	(1) Development a	(1) Development and implementation of a storm water management plan.					
	(2) Regular inspection of erosion prone areas for signs of erosion.						
	(3) A soil conservation and stockpiling plan to be developed and implemented.						
	(4) Monthly monitor	ring of water qua	ality (as per recom	mendation of specialis	st study).		

Activity:	2. Site clearing and	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure					
Impact:	Degradation of so	Degradation of soil resources					
	Direct Impact: If n	ot managed prop	erly, fertile soil w	rill be lost during site	clearance and topsoil		
	striping. Loss of fe	ertile soil will cau	use the degradat	tion of habitat for flo	ora micro- and macro		
	organisms.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	1	6	5	45		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Degradation of soi	l resources can b	e <i>remedied</i> in th	e following ways:			
	(1) Develop and im	plement soil cons	servation and sto	ckpile management p	olan.		
	(2) Develop and im	plement a Rehab	ilitation plan.				
Impact:	Erosion – Loss of	fertile soil					
	Direct Impact: Un-	-vegetated areas	exposed to wea	thering for an extend	ded period of time will		
	lead to erosion. E	rosion prone are	as have a high	risk of losing fertile	soil caused by flash		
	floods. The loss of	fertile soil will res	ult in the loss of i	mportant micro ecos	ystems.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Erosion can be cor	ntrolled in the foll	lowing ways:	-			
	(1) Development ar	nd implementation	n of a storm wate	er management plan.			
	(2) Regular inspect	(2) Regular inspection of erosion prone areas for signs of erosion.					
	(3) A soil conservat	tion and stockpilir	ng plan to be dev	eloped and impleme	nted.		
	(4) Monthly monitor	ring of water qual	ity (as per recom	mendation of special	list study).		

Activity:	5. Mining offices i.e. operation of training centres, offices and kitchen facilities
Impact:	General waste generation & Littering - Soils quality due to leachates
	Direct Impact: Littering throughout the construction and operational phase poses the risk of
	the visual environment to be affected negatively. 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.
	Indirect Impact: Exposure of leachate to the natural environment poses a health risk to the
	surrounding fauna and flora habitats as well as human health.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	3	1	6	5	50	
Post-Mitigation	4	1	2	4	28	
Mitigation Magazza	Curfoso Motor aus	Curfoon Water quality due to leachetee can be controlled in the following ways:				

Mitigation Measures:

Surface Water quality due to leachates can be controlled in the following ways:

- (1) Develop and implement as waste management plan with the focus on reuse, reduce, recycle, or avoid.
- (2) Development and maintenance of a waste disposal record keeping system.

Activity:	6. Storm water runoff management features				
Impact:	Erosion – Loss of	fertile soil			
	Direct Impact: Imp	oroper manageme	ent of storm water	runoff poses a high	risk to erosion. Un-
	vegetated or degra	aded areas expo	sed to weathering	g for an extended pe	eriod of time are a
	contributing factor.	Erosion prone ar	reas have a high	risk of losing fertile s	oil caused by flash
	floods. The loss of	fertile soil will resu	ult in the loss of im	portant micro ecosys	tems.
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	2	4	3	30
Mitigation Measures:	Erosion can be co	ntrolled in the fol	lowing ways:	1	
	(1) Development and implementation of a storm water management plan.				
	(2) Regular inspection of erosion prone areas for signs of erosion.				
	(3) A soil conservat	tion and stockpilin	g plan to be devel	oped and implemente	ed.
	(4) Monthly monitor	ring of water quali	ty (as per recomm	endation of specialist	study).

Activity:	9.Stores, workshops &wash bays
Impact:	Hydrocarbon Contamination
	Direct Impact: Throughout the construction & operation phase equipment and plant are used.
	This poses a risk of hydrocarbon spills if equipment/plant is not maintained. Depending on the

	size of the spill the level of contamination may vary from insignificant to significant and may					
	affect the surrounding water quality (both surface and sub-surface) as well as the soil quality.					
	The improper man	agement of oil se	parators/sumps n	nay also lead to the o	contamination of the	
	surrounding enviro	nment.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamir	nation can be contro	<i>lled</i> in the following	
	ways:					
	(1) Develop and im	plement a Hazard	dous substances	management plan sp	ecifically addressing	
	handling, storage, a	and transport of h	azardous substan	ces.		
	(2) Develop and ir	nplement an eme	ergency response	procedure addressir	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensu	re the fastest possible	e reaction to spills or	
	accidents as well a	s addressing remo	ediation procedure	es.		
	(3) Development ar	nd implementation	of an incident re	porting procedure.		
Impact:	Degradation of soil resources					
	Direct Impact: Th	ne continuous sp	ills of hydrocarbo	ons and hazardous	substances pose a	
	environmental risk	to the surrounding	g soil quality. The	degradation of the s	oil quality will cause	
	the loss of habitat of	or healthy environ	ment for micro ec	osystems.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Degradation of soil	Degradation of soil resources can be <i>remedied</i> in the following ways:				
	(1) Develop and im	plement soil cons	ervation and stoc	kpile management pla	an.	
	(2) Develop and im	(2) Develop and implement a Rehabilitation plan.				

Activity:	10. Ablutions & change house with sewage treatment plant						
Impact:	Degradation of so	Degradation of soil resources					
	Direct Impact: Co	ntinuous leakin	g or lack of maint	enance poses a ris	k to contaminating the		
	surrounding soils	and degrading	the soil quality. T	his will affect the r	micro-ecosystems in a		
	negative manner.	negative manner.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	4 1 6 5 55					
Post-Mitigation	4	4 1 6 3 33					
Mitigation Measures:	Degradation of soil	Degradation of soil resources can be <i>remedied</i> in the following ways:					



- (1) Develop and implement soil conservation and stockpile management plan.
- (2) Develop and implement a Rehabilitation plan.

Activity:	11. Fuel operating power generators					
Impact:	Hydrocarbon Contamination					
		Direct Impact: The construction of improper generator facilities poses a risk of the surrounding				
	-	environment to be exposes to continuous leaking of hydrocarbons leading possibly				
		•			•	
		ace and sub-sun	ace water source	es as well as the so	ons surrounding the	
	facility.	r=				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	lled in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing	
	handling, storage, a	and transport of ha	azardous substan	ces.		
	(2) Develop and in	nplement an eme	ergency response	procedure addressir	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing reme	ediation procedure	es.		
	(3) Development ar	nd implementation	of an incident rep	porting procedure.		
Impact:	Degradation of so	·	<u>'</u>			
•			e to hydrocarbon	leaks poses a risk to	the degradation of	
	the surrounding soi	•		, , , , , , , , , , , , , , , , , , ,	are regression or	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	4	1	6	3	33	
•					33	
Mitigation Measures:	Degradation of soil			•		
		•		kpile management pla	n.	
	(2) Develop and im	plement a Rehabi	litation plan.			

Activity:	13. Fuel storage
Impact:	Hydrocarbon Contamination
	Direct Impact: The construction of improper storage facilities poses a risk of the surrounding
	environment to be exposes to continuous leaking of hydrocarbons leading possibly
	contaminating surface and sub-surface water sources as well as the soils surrounding the



	facility.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be controlled in the following				
	ways:				
	(1) Develop and im	plement a Hazar	dous substances i	management plan spe	ecifically addressing
	handling, storage,	and transport of h	azardous substan	ces.	
	(2) Develop and ir	mplement an eme	ergency response	procedure addressing	ng the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing rem	ediation procedure	es.	
	(3) Development a	nd implementatior	of an incident rep	porting procedure.	
Impact:	Degradation of so	il resources			
	Direct Impact: Co	ntinuous exposur	e to hydrocarbon	leaks poses a risk to	the degradation of
	the surrounding so	l resources.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	6	5	55
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:	
	(1) Develop and im	plement soil cons	ervation and stock	kpile management pla	n.
	(2) Develop and im	plement a Rehab	ilitation plan.		

Activity:	15. Transport of construction material, mobile plant and equipment to the site					
Impact:	Hydrocarbon Con	Hydrocarbon Contamination				
	Direct Impact: Th	roughout the co	nstruction phase	construction equipm	ent are used. This	
	poses a risk of hyd	rocarbon spills if	equipment is not r	maintained. Dependin	ng on the size of the	
	spill the level of c	ontamination may	vary from insign	nificant to significant	and may affect the	
	surrounding water	quality (both surfa	ce and sub-surfac	ce) as well as the soil	quality.	
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	1	1	8	5	50	
Post-Mitigation	1	1	4	3	18	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamin	ation can be <i>contro</i>	<i>lled</i> in the following	
	ways:	ways:				
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing	
	handling, storage, a	and transport of h	azardous substan	ces.		

	(2) Develop and ir	mplement an eme	ergency response	procedure addressi	ng the procedure in	
	case of a chemical	spill. This proceed	dure should ensu	re the fastest possible	e reaction to spills or	
	accidents as well a	ccidents as well as addressing remediation procedures.				
	(3) Development a	nd implementatior	n of an incident re	porting procedure.		
Impact:	Erosion – Loss of	fertile soil				
	Indirect Impact: In	mproper manager	ment of storm wa	ter may lead to erosion	on along the access	
	routes. This may le	ad to the loss of	fertile soil and in i	ts turn affect the micr	o-ecosystems of the	
	surrounding enviro	nment.				
	Duration Extent Magnitude Probability Significance					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Significance rating: Pre-Mitigation	Duration 2	Extent 1	Magnitude 6	Probability 5	Significance 45	
		Extent 1	· ·			
Pre-Mitigation		1	6	5	45	
Pre-Mitigation Post-Mitigation	2 1 Erosion can be <i>co</i>	1 1 ntrolled in the fol	6 6 lowing ways:	5	45	
Pre-Mitigation Post-Mitigation	2 1 Erosion can be <i>co</i>	1 1 ntrolled in the folind implementation	6 6 llowing ways:	5 3 management plan.	45	
Pre-Mitigation Post-Mitigation	2 1 Erosion can be <i>co</i> (1) Development an (2) Regular inspect	1 ntrolled in the folend implementation in the folence of erosion procession procession procession and the folence of erosion and the folence of erosion and the folence of erosion procession and the folence of erosion and the erosion and the folence of erosion and the ero	6 6 llowing ways: n of a storm water	5 3 management plan.	45 24	

Activity:	16. Use of existing	16. Use of existing drilled / new boreholes				
Impact:	Hydrocarbon Contamination					
	Direct Impact: Th	Direct Impact: The lack of inspections or regular maintenance of facilities such as water				
	pumps poses a risk	to contaminatir	ng the surface and	sub-surface water re	esource.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	2	6	5	45	
Post-Mitigation	4	1	4	3	18	
Mitigation Measures:	Potential impact re	esulting from hy	drocarbon contam	ination can be <i>conti</i>	rolled in the following	
	ways:					
	(1) Develop and im	nplement a Haza	ardous substances	management plan s	pecifically addressing	
	handling, storage,	and transport of	hazardous substa	nces.		
	(2) Develop and ir	mplement an er	nergency respons	e procedure address	sing the procedure in	
	case of a chemical	spill. This prod	edure should ensu	ure the fastest possib	le reaction to spills or	
	accidents as well a	s addressing re	mediation procedu	res.		
	(3) Development a	nd implementati	on of an incident re	eporting procedure.		

Aspect:	Terrestrial Ecosystems
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Activity:	1. Access and haul	ing along roads i.e	e. during the const	truction of roads	
Impact:	Vegetation and ha	bitat loss			
	Direct Impact: Cle	aring the area to	construct the acc	ess roads leads to the	e loss of vegetation
	and habitats of mad	cro and micro org	anisms. Loss of ve	egetation, increase in	runoff and erosion,
	possible distribution and increased establishment of alien invasive species, possible				
	disturbance and re	eduction of habita	t, injury or death	to terrestrial fauna,	possible change of
	natural runoff and	drainage patterns	s causing acceler	ated erosion, possibl	e loss of protected
	species, possible ¡	permanent loss o	f re-vegetation po	otential of soil surfac	e, increase in dust
	levels, interference	with fauna beha	vioural activities,	possible exposure of	fauna and flora to
	contaminants – esp	ecially hydrocarb	ons and increased	l dust levels	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	4	5	50
Post-Mitigation	4	1	2	4	28
Mitigation Measures:	The loss of vegetat	ion can be <i>remed</i>	lied in the followin	g ways:	
	(1) Development ar	nd implementation	of a rehabilitation	ı plan.	
	(2) Develop and im	plement a plant sp	pecies search and	rescue management	plan.
Impact:	Influx of alien inva	asive vegetation			
	Direct Impact: Sit	te clearing for ro	ads, lay down ar	eas, and mining are	a exposes the un-
	vegetated area to	the influx of alier	n invasive vegeta	tion causing Irrevers	ible damage to the
	native fauna and flo	ora species and lo	ss of habitats.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	2	6	5	55
Post-Mitigation	2	1	4	4	28
Mitigation Measures:	The influx of alien in	nvasive vegetation	n can be <i>controlle</i>	ed in the following way	ys:
	(1) Development ar	nd implementation	of an alien and in	vasive control plan.	
	(2) Awareness tra	aining on the ide	entification of we	eds and alien spec	cies to employees
	responsible for the	management of the	nese species.		

Activity:	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure				
Impact:	Vegetation and habitat loss				
	Direct Impact: Clearing of site and stripping of topsoil leads to the loss of vegetation and				
	habitats of macro and micro organisms. Loss of vegetation, increase in runoff and erosion,				
	possible distribution and increased establishment of alien invasive species, possible				

	disturbance and reduction of habitat, injury or death to terrestrial fauna, possible change of				
	natural runoff and	natural runoff and drainage patterns causing accelerated erosion, possible loss of protected			
	species, possible	species, possible permanent loss of re-vegetation potential of soil surface, increase in dust			
	levels, interference	with fauna beha	vioural activities,	possible exposure of	f fauna and flora to
	contaminants – esp	pecially hydrocarb	ons and increased	d dust levels	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	1	10	5	70
Post-Mitigation	2	1	6	4	36
Mitigation Measures:	The loss of vegetat	ion can be remed	lied in the followin	g ways:	
	(1) Development a	nd implementation	of a rehabilitation	n plan.	
	(2) Develop and im	plement a plant s	pecies search and	I rescue management	t plan.
Impact:	Influx of alien inva	asive vegetation			
	Direct Impact: Site clearing for roads, lay down areas, and mining area exposes the un-				
	Direct Impact: Si	te cleaning for to	ads, lay down ai	reas, and mining are	ea exposes the un-
	•	J	. •	reas, and mining are ation causing Irrevers	•
	•	the influx of alier	n invasive vegeta		•
Significance rating:	vegetated area to	the influx of alier	n invasive vegeta		•
Significance rating: Pre-Mitigation	vegetated area to	the influx of alien	n invasive vegeta	ation causing Irrevers	ible damage to the
	vegetated area to native fauna and flo	the influx of alien ora species and lo Extent	n invasive vegeta ss of habitats. Magnitude	Probability	Significance
Pre-Mitigation	vegetated area to native fauna and flo Duration 4 2	the influx of alien ora species and lo Extent 2	n invasive vegeta ss of habitats. Magnitude 6 4	Probability 5	Significance 60 28
Pre-Mitigation Post-Mitigation	vegetated area to native fauna and flo Duration 4 2 The influx of alien i	the influx of alien or species and lo Extent 2 1 nvasive vegetation	n invasive vegetals sof habitats. Magnitude 6 4 n can be controlled	Probability 5 4	Significance 60 28
Pre-Mitigation Post-Mitigation	vegetated area to native fauna and flo Duration 4 2 The influx of alien i (1) Development are	the influx of alien or species and lo Extent 2 1 nvasive vegetation and implementation	n invasive vegetass of habitats. Magnitude 6 4 n can be controller of an alien and in	Probability 5 4 ed in the following wa	Significance 60 28 ys:

Activity:	5. Mining offices i.e. operation of training centres, offices and kitchen facilities				
Impact:	Influx of alien inva	asive vegetatior	1		
	Direct Impact: If a	reas remain un-	vegetated, this po	oses the risk of alien a	nd invasive species
	instating and sprea	ding to the surro	unded areas.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	2	1	4	3	21
Mitigation Measures:	The influx of alien i	nvasive vegetation	on can be <i>contro</i>	<i>lled</i> in the following wa	ys:
	(1) Development a	(1) Development and implementation of an alien and invasive control plan.			
	(2) Awareness tra	(2) Awareness training on the identification of weeds and alien species to employees			
	responsible for the	management of	these species.		

Activity:	6. Storm water rund	off management f	eatures			
Impact:	Vegetation and ha	bitat loss				
	Direct Impact: Cle	Direct Impact: Clearing of site and stripping of topsoil during the construction of storm water				
	runoff management features poses a risk to the loss of vegetation and habitats of macro and					
	micro organisms. L	oss of vegetation	n, increase in run	off and erosion, possi	ible distribution and	
	increased establish	hment of alien i	nvasive species,	possible disturbance	e and reduction of	
	habitat, injury or d	leath to terrestria	al fauna, possible	change of natural r	unoff and drainage	
	patterns causing a	ccelerated erosio	n, possible loss o	of protected species,	possible permanent	
	loss of re-vegetation	on potential of so	il surface, increa	se in dust levels, inte	rference with fauna	
	behavioural activiti	es, possible exp	osure of fauna	and flora to contam	inants - especially	
	hydrocarbons and i	ncreased dust lev	/els			
	Indirect Impact: If	areas surroundin	g the storm wate	r features are not reha	bilitated properly or	
	features installed a	re not constructe	d according to th	e storm water manage	ement model, these	
	areas are prone to	erosion.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	2	1	4	3	18	
Mitigation Measures:	The loss of vegetat	ion can be <i>remed</i>	lied in the following	ng ways:		
	(1) Development ar	nd implementatior	n of a rehabilitatio	n plan.		
	(2) Develop and im	plement a plant s	pecies search and	d rescue management	plan.	

Activity:	9.Stores, workshop	9.Stores, workshops & wash bays				
Impact:	Chemical Fires –	Chemical Fires – Loss of ecosystems				
	Direct Impact: The	e improper storaç	ge of hazardous	substances poses a ri	sk of chemical fires.	
	In the event of a c	chemical fire the	impact to the su	rrounding environment	t is significant. Fires	
	may lead to the los	may lead to the loss of ecosystems, damage to properties and fatalities.				
Significance rating:	Duration	uration Extent Magnitude Probability Significance				
Pre-Mitigation	2	1	10	5	65	
Post-Mitigation	1	1	8	3	30	
Mitigation Measures:	Chemical fires can	Chemical fires can be avoided n the following ways:				
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan.				
	(2) Develop an emergency procedure addressing in particular the management of chemical				gement of chemical	
	fires and spill response.					
	(3) Report and record all incidents related to chemical fires.					
	(4) Employees mu	st be trained on	emergency resp	oonse procedures requ	uired to counter the	

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nature and hazards of an accidental release.

- (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.
- (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.).
- (7) The emergency response procedure should 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.
- (8) Procedures should 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.

Activity:	11. Fuel operating	11. Fuel operating power generators			
Impact:	Chemical Fires – I	Chemical Fires – Loss of ecosystems			
	Direct Impact: The	e improper storaç	ge of hazardous	substances poses a ris	sk of chemical fires.
	In the event of a c	hemical fire the	impact to the sur	rrounding environment	is significant. Fires
	may lead to the los	s of ecosystems,	damage to prope	erties and fatalities.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	2	10	5	65
Post-Mitigation	1	1	8	2	20
Mitigation Measures:	Chemical fires can	Chemical fires can be avoided n the following ways:			
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan.			
	(2) Develop an emergency procedure addressing in particular the management of chemical				
	fires and spill response.				
	(3) Report and record all incidents related to chemical fires.				
	(4) Employees must be trained on emergency response procedures required to counter the				uired to counter the
	nature and hazards of an accidental release.				
	(5) Employees mus	st be familiar wit	h and have recei	ved the appropriate tra	aining regarding the
	handling and storag	ge practices, for a	all containers with	which they will come i	into contact.

- (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.).
- (7) The emergency response procedure should 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.
- (8) Procedures should 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.

Activity:	13. Fuel storage	13. Fuel storage			
Impact:	Chemical Fires –	Chemical Fires – Loss of ecosystems			
	Direct Impact: The	e improper storaç	ge of hazardous	substances poses a	risk of chemical fires.
	In the event of a c	hemical fire the	impact to the su	rrounding environme	ent is significant. Fires
	may lead to the los	s of ecosystems,	damage to prope	erties and fatalities.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	2	10	5	65
Post-Mitigation	1	1	8	2	20
Mitigation Measures:	Chemical fires can	Chemical fires can be avoided n the following ways:			
	(1) Develop and im	plement a Hazaro	dous substances	management plan.	
	(2) Develop an emergency procedure addressing in particular the management of chemical fires and spill response.				nagement of chemical
	(3) Report and record all incidents related to chemical fires.(4) Employees must be trained on emergency response procedures required to counter the counter of the count				
				equired to counter the	
	nature and hazards of an accidental release. (5) Employees must be familiar with and have received the appropriate training regarding the				
					training regarding the
	handling and storage practices, for all containers with which they will come into contact. (6) Document the types and amounts of hazardous materials present on the project sit			e into contact.	
				nt on the project site	
	(including for example the name and description, classification, regulatory reporting threshold,				
	quantities, characte	eristics, analysis	of potential cons	sequence, identificat	ion of location, details

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of responsible persons, detail of availability of spill response equipment etc.).

- (7) The emergency response procedure should 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.
- (8) Procedures should 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.

Aspect:	Noise Quality
-	· ·

Activity:	1. Access and haul	ing along roads i.e	e. during the cons	truction of roads	
Impact:	Noise Generation	Noise Generation			
	Direct Impact: Inci	reased noise level	s at potentially se	nsitive receptors exce	eding criteria of the
	Noise Control Reg	ulations legislatio	n (NCR) and SAM	NS guidelines; Chang	ging ambient sound
	levels could chang	e the acceptable	land use capabilit	y; Changing ambient	sound levels could
	increase annoyanc	increase annoyance and potential complaints; and Disturbing character of sound.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	6	4	32
Post-Mitigation	1	1	4	3	18
Mitigation Measures:	Noise generation ca	Noise generation can be <i>controlled</i> in the following ways:			
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist			udit Programme as	
				on the specialist	
	recommendations (Appendix F).				
	(2) Recording, repo	(2) Recording, reporting, and remediating incidents related to noise.			
	(3) Regular inspect	ions of vehicles/ed	quipment/plant.		

Activity:	2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure
Impact:	Noise Generation
	Direct Impact: The use of construction equipment during site clearing and topsoil stripping
	may cause noise during the construction phase. If equipment is not maintained and serviced

	regularly high level	s of noise may re	esult throughout the	he construction and c	perational phase.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	3	1	6	5	50	
Post-Mitigation	1	1	4	3	18	
Mitigation Measures:	Noise generation can be <i>controlled</i> in the following ways: (1) Development and implementation of an Acoustical Measurement & Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F).					
					d on the specialist	
	(2) Recording, reporting, and remediating incidents related to noise.					
	(3) Regular inspections of vehicles/equipment/plant.					

Activity:	5. Mining offices (construction and	operation) i.e. op	peration of training o	centres, offices and
	kitchen facilities				
Impact:	Noise Generation	Noise Generation			
	Direct Impact: Th	e use of construc	ction equipment n	nay cause noise duri	ng the construction
	phase. If equipmer	nase. If equipment is not maintained and serviced regularly high levels of noise may result			
	throughout the con-	nroughout the construction and operational phase.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	4	5	30
Post-Mitigation	1	1	4	3	18
Mitigation Measures:	Noise generation ca	Noise generation can be <i>controlled</i> in the following ways:			
	(1) Development a	(1) Development and implementation of an Acoustical Measurement & Audit Programme as			udit Programme as
	part of the EMS. A monitoring program to be developed based on the specialist			on the specialist	
	recommendations (Appendix F).				
	(2) Recording, repo	(2) Recording, reporting, and remediating incidents related to noise.			
	(3) Regular inspect	ions of vehicles/ed	quipment/plant.		

Activity:	9.Stores, workshops &wash bays				
Impact:	Noise Generation				
	Direct Impact: The	e use of equipme	nt may cause noi	se during the operati	on of workshops. If
	equipment is not maintained and serviced regularly high levels of noise may result throughout				
	the construction an	d operational pha	se.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	4	5	30



Post-Mitigation	1	1	4	3	18
Mitigation Measures:	Noise generation ca	an be controlled	in the following wa	ays:	
	(1) Development a	nd implementatio	n of an Acoustic	al Measurement & A	udit Programme as
	part of the EMS	. A monitoring	program to be	developed based	on the specialist
	recommendations (Appendix F).			
	(2) Recording, repo	rting, and remedia	ating incidents rel	ated to noise.	
	(3) Regular inspect	ions of vehicles/ed	quipment/plant.		

Activity:	11. Fuel operating	11. Fuel operating power generators				
Impact:	Noise Generation	Noise Generation				
	Direct Impact: The	e use of generato	ors to produce ele	ectricity may result in	noise generation if	
	equipment is not m	quipment is not maintained.				
Significance rating:	Duration	ration Extent Magnitude Probability Significance				
Pre-Mitigation	1	1	4	5	30	
Post-Mitigation	1	1	4	3	18	
Mitigation Measures:	Noise generation ca	Noise generation can be <i>controlled</i> in the following ways:				
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as					
	part of the EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F).					
	(2) Recording, repo	(2) Recording, reporting, and remediating incidents related to noise.				
	(3) Regular inspect	ions of vehicles/e	quipment/plant.			

Aspect:	Socio-economic
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Activity:	14. Employment of workers and procurement of construction materials					
Impact:	Loss of farm labour					
	Direct Impact: Inc	reased demand	of labour force po	oses a risk of the local	farmers losing farm	
	labour due to comp	peting financial in	icome.			
Significance rating:	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	2	4	5	50	
Post-Mitigation	4	4 2 2 4 32				
Impact:	Population Influx	Population Influx – Pressure on Resources				
	Direct Impact: Increased demand for labour force poses a risk of a population influx in the					
	local district municipality. The increasing population will put pressure on the local municipality to					
	provide services su	uch as sewage, d	drinking water, wa	ste management, elect	ricity etc.	



Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	2	4	5	50				
Post-Mitigation	4	2	2	4	32				
Impact:	Population Influx – Social Pathologies								
	Direct Impact: Inc	Direct Impact: Increased demand for labour force poses a risk of a population influx. The							
	increased population	on influx may lea	ad to conflicting s	social pathologies in	the surrounding loca				
	community.								
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	2	4	5	50				
Post-Mitigation	4	2	2	4	32				
	Job Creation and Skills Training								
Impact:	Job Creation and	Skills Training							
Impact:		•	mployed labour f	orce will form part	of a skills and trainin				
Impact:	Direct Impact: As	positive, local e		•	of a skills and trainin				
Impact:	Direct Impact: As	positive, local e		•					
Impact: Significance rating:	Direct Impact: As development progr	positive, local e		•					
Significance rating:	Direct Impact: As development progr least a total of 60 p	positive, local eramme. The propeople.	posed mining ope	eration will create a	job opportunity for a				
Significance rating: Pre-Mitigation	Direct Impact: As development progresses a total of 60 p	positive, local eramme. The propeople.	Magnitude	Probability	Significance				
	Direct Impact: As development progr least a total of 60 p Duration 4	positive, local eramme. The propeople. Extent 2	Magnitude 0 0	Probability 4 4	Significance				
Significance rating: Pre-Mitigation Post-Mitigation	Direct Impact: As development progressed least a total of 60 production 4 4 Job Creation (Mul.)	positive, local eramme. The propeople. Extent 2 2 Itiplier affect) an	Magnitude 0 0 d Population Inf	Probability 4 4	Significance				
Significance rating: Pre-Mitigation Post-Mitigation	Direct Impact: As development progressed least a total of 60 production 4 4 Job Creation (Mul.)	positive, local eramme. The propeople. Extent 2 2 Itiplier affect) and cial projects form	Magnitude 0 0 d Population Infing part of the pro	Probability 4 4	Significance 24 24				
Significance rating: Pre-Mitigation Post-Mitigation	Direct Impact: As development progressed least a total of 60 production 4 4 Job Creation (Mul. Direct Impact: Social and Social Action (Mul. Direct Impact: Acti	positive, local eramme. The propeople. Extent 2 2 Itiplier affect) and cial projects form	Magnitude 0 0 d Population Infing part of the pro	Probability 4 4	Significance 24 24				
Significance rating: Pre-Mitigation Post-Mitigation Impact:	Direct Impact: As development progressions least a total of 60 production 4 4 Job Creation (Multiple Direct Impact: Social job opportunities for the second seco	positive, local eramme. The propeople. Extent 2 Itiplier affect) and cial projects form or the local comments.	Magnitude 0 0 d Population Infing part of the prounities.	Probability 4 4 Probability 9 9 9 9 9 9 9 9 9 9 9 9 9	Significance 24 24 ct will create additional				
Significance rating: Pre-Mitigation Post-Mitigation Impact: Significance rating:	Direct Impact: As development progressions least a total of 60 production 4 4 Job Creation (Multiple Direct Impact: Sociation progression) Duration	positive, local eramme. The propeople. Extent 2 Itiplier affect) and cial projects form or the local communication.	Magnitude 0 0 d Population Infing part of the prounities. Magnitude	Probability 4 4 ilux possed mining proje Probability	Significance 24 24 ct will create additional				
Significance rating: Pre-Mitigation Post-Mitigation Impact: Significance rating: Pre-Mitigation	Direct Impact: As development progressed least a total of 60 production 4 Job Creation (Multiple Direct Impact: Society opportunities for Duration 4	positive, local eramme. The propeople. Extent 2 Itiplier affect) and cial projects form or the local communication. Extent 3 2	Magnitude 0 0 d Population Infing part of the prounities. Magnitude 0 0 0	Probability 4 4 4 Probability Probability Probability 4 4 4 4 4 4 4 4 4 4 4 4 4	Significance 24 24 ct will create additional Significance 35				
Significance rating: Pre-Mitigation Post-Mitigation Impact: Significance rating: Pre-Mitigation Post-Mitigation	Direct Impact: As development progress a total of 60 pc Duration 4 Job Creation (Multiple Direct Impact: Society of poportunities for Duration 4 4 4	positive, local eramme. The propeople. Extent 2 Itiplier affect) and cial projects form or the local communication of the local communication and cial projects form or the local communication and cial projects for the local communication and c	Magnitude 0 0 d Population Infing part of the prounities. Magnitude 0 0 controlled in the	Probability 4 4 4 Probability Probability Probability 4 4 4 4 4 4 4 4 4 4 4 4 4	Significance 24 24 ct will create additional Significance 35				

Aspect:		Heritage and cultural resources				
	Activity:	Site clearing and topsoil stripping for lay down				
	Impact:	Destruction of graves				
		Direct Impact: Proposed activities in close proximity to identified graves poses the risk of				
		destructing graves of great cultural and heritage importance.				

(3) Develop and implement a skills development program.



	Indirect Impact: Loss of heritage and history for the future generation of the affected					
	community.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	6	5	65	
Post-Mitigation	5	2	6	3	39	
Mitigation Measures:	The destruction of	graves can be <i>avo</i>	pided in the follow	ing ways:		
	(1) Develop and i	mplement an aw	areness campaig	n on the protection	of social heritage	
	impacts.					
	(2) Clear marking of	of graves discover	ed by the Heritag	e Impact Assessmen	t Report (Appendix	
	O)					
Impact:	Degradation of cu	Itural significand	e heritage sites			
	Direct Impact: Pro	posed mining acti	vities in close pro-	ximity to cultural signi	ficant heritage sites	
	pose the risk of deg	grading or loss of t	these sites.			
	Indirect Impact:	Loss of heritage	and history for	the future generation	on of the affected	
	community.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	6	5	65	
Post-Mitigation	5	2	6	3	39	
Mitigation Measures:	The degradation of	cultural significan	t heritage sites ca	n be avoided in the f	ollowing ways:	
	(1) Develop and implement an awareness campaign on the protection of social heritage					
	impacts.					
	(2) Clear marking	(2) Clear marking of identified heritage sites discovered by the Heritage Impact Assessment				
	Report (Appendix	O)				



Operational Phase					
Aspect:	Air Quality				

Activity:	18.Topsoil and subsoil stripping & stockpiling for mining operation area						
Impact:	Dust Generation		<u> </u>				
	Direct Impact: Cl	earing of vegetat	ion for topsoil a	nd subsoil stripping	exposes the mining		
	operation area to	dust generation. H	High levels of du	st fallout will affect t	the overall air quality.		
	The generation of o	The generation of dust during these activities will affect the visual environment negatively.					
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout m	ay lead to unhealthy		
	environment for em	ployees and surro	ounding commun	ities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	6	5	60		
Post-Mitigation	2	1	6	3	27		
Mitigation Measures:	Fugitive dust gener	ration can be con t	trolled in the follo	owing ways:			
	(1) Development of	a dust fallout mo	nitoring and man	agement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and r	ecording incidents	s related to air qu	ality.			
	A number of recon	nmendation result	ed from the Air (Quality Assessment	(Appendix E). These		
	recommendations	are included in F	Part B of this re	port. One of the re	commendations is to		
	develop a detailed	air quality manag	ement plan (foo	using on sources of	dust located in close		
	proximity to the re	esidential recepto	ors within the p	roject boundary) er	suring adherence to		
	thresholds stipulat	ted in the Base	line Air Quality	Impact Assessme	ent report (BAQIAR)		
	(Appendix E) prior	to the commence	ement of operatio	ns.			
	There are also a nu	umber of legislativ	e requirements s	tipulated in the follov	ving regulations:		
	• GN R. 283	3: National reporti	ng regulations;				
	• GN R. 12	10: National Ambi	ent Air quality sta	ndards; and			
	• GN R. 897	7: National dust co	ontrol regulations				
Impact:	CO ₂ emissions						
	Direct Impact: Th	e use of diesel of	perated constru	ction equipment will	cause a contributing		
	factor the BCR Min	erals (Pty) Ltd car	bon footprint.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	4	5	45		
Post-Mitigation	4	1	2	4	28		
Mitigation Measures:	CO ₂ emissions and	I the release of no	xious gasses ca	n be <i>controlled</i> in th	e following ways:		
	(1) Develop and ma	aintain a carbon fo	ootprint reporting	policy;			

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES DMR REF: LP 30/5/1/2/3/2/1 (10104)

(2) Monitor the carbon footprint throughout the entire life cycle of the Spitsvale project;

- (3) Develop and implement a hazardous substance management plan; and
- (4) Reporting and recording incidents.

A number of recommendation resulted from the Air Quality Assessment (**Appendix E**). These recommendations are included in Part B of this report.

GN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of 1965 stipulated a list of requirements in terms of regulating emissions form diesel operated vehicles/plant/equipment.

Activity:	19.Opencast mining excavations						
Impact:	Dust Generation						
	Direct Impact: Exp	Direct Impact: Exposed un-vegetated mining areas may lead to high levels of dust fallout and					
	will affect the over	will affect the overall air quality. The generation of dust during these activities will affect the					
	visual environment	negatively.					
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout ma	y lead to unhealthy		
	environment for em	ployees and surr	ounding commur	nities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	6	5	60		
Post-Mitigation	4	2	4	4	40		
Mitigation Measures:	Fugitive dust gener	ration can be <i>con</i>	trolled in the follo	owing ways:			
	(1) Development of	a dust fallout mo	nitoring and man	agement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and r	ecording incidents	s related to air qu	ıality.			
	A number of recon	nmendation result	ed from the Air	Quality Assessment (A	Appendix E). These		
	recommendations	are included in F	Part B of this re	port. One of the rec	ommendations is to		
	develop a detailed	air quality manag	gement plan (foo	cusing on sources of o	dust located in close		
	proximity to the re	esidential recepto	ors within the p	roject boundary) ens	suring adherence to		
	thresholds stipulat	ted in the Base	eline Air Quality	/ Impact Assessmer	nt report (BAQIAR)		
	(Appendix E) prior	to the commence	ement of operation	ons.			
	There are also a nu	umber of legislativ	e requirements s	tipulated in the followi	ng regulations:		
	• GN R. 283	3: National reporti	ng regulations;				
	• GN R. 12 ⁴	10: National Ambi	ent Air quality sta	andards; and			
	GN R. 897: National dust control regulations.						
Impact:	CO ₂ emissions						
	Direct Impact: Th	e use of diesel o	perated constru	ction equipment will o	cause a contributing		

	factor the BCR Minerals (Pty) Ltd carbon footprint.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	4	5	50			
Post-Mitigation	4	1	2	4	28			
Mitigation Measures:	CO ₂ emissions and	the release of no	xious gasses car	be controlled in the	following ways:			
	(1) Develop and ma	(1) Develop and maintain a carbon footprint reporting policy;						
	(2) Monitor the carbon footprint throughout the entire life cycle of the Spitsvale project;							
	(3) Develop and im	plement a hazard	ous substance m	anagement plan; and				
	(4) Reporting and r	ecording incidents	S.					
	recommendations a	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These ecommendations are included in Part B of this report. SN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of						
	vehicles/plant/equi	•	113 111 (611115 01 16	egulating emissions fo	onn dieser operatet			

Activity:	20.Drilling & Blasting						
Impact:	Dust Generation						
	Direct Impact: Do	Direct Impact: Dust being generated form drilling and blasting activities poses the risk of					
	affecting the ambie	nt air quality. Thi	s also affects the	visual environment.			
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout may	/ lead to unhealthy		
	environment for em	nployees and surr	ounding commun	ities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	3	2	6	5	55		
Post-Mitigation	4	1	4	4	36		
Mitigation Measures:	Fugitive dust gener	ration can be <i>con</i>	trolled in the follo	owing ways:			
	(1) Development of	f a dust fallout mo	nitoring and man	agement plan;			
	(2) Frequent Inspe	ctions; and					
	(3) Reporting and r	ecording incident	s related to air qu	ality.			
	A number of recon	nmendation result	ted from the Air	Quality Assessment (A	ppendix E). These		
	recommendations	are included in I	Part B of this re	port. One of the reco	ommendations is to		
	develop a detailed	air quality manag	gement plan (foo	cusing on sources of d	ust located in close		
	proximity to the r	esidential recepto	ors within the p	roject boundary) ensi	uring adherence to		
	thresholds stipula	ted in the Base	eline Air Quality	/ Impact Assessmen	t report (BAQIAR)		
	(Appendix E.) prio	r to the commend	ement of operation	ons.			
	There are also a nu	umber of legislativ	e requirements s	tipulated in the followir	ng regulations:		
	` / .		•		ng regulations:		

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Activity:	22. RoM & product	stockpiling				
Impact:	Dust Generation					
	Direct Impact: Continuous use of haul road often leads to the generation of fugitive dust					
	comprising TSP, F	comprising TSP, PM10 and PM2.5 from the dirt roads. Stockpiled RoM and product are				
	continuously expo	sed to weathering	ng leading the g	generation of fine o	dust particles. The	
	generation of dus	t during these	activities will affe	ect the visual envir	onment negatively.	
	Indirect Impact: (Continuous expos	ure to high levels	s of dust fallout may	lead to unhealthy	
	environment for em	ployees and surro	ounding communit	ies.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follow	ving ways:		
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording incidents	s related to air qua	lity.		
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These	
	recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to	
	develop a detailed	air quality manag	ement plan (focu	sing on sources of d	ust located in close	
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensu	uring adherence to	
	thresholds stipulat	ed in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)	
	(Appendix E) prior	to the commence	ment of operation	S.		
	There are also a nu	ımber of legislativ	e requirements sti	pulated in the followir	ng regulations:	
	• GN R. 283	3: National reportin	ng regulations;			
	• GN R. 12 ²	10: National Ambie	ent Air quality stan	dards; and		
	• GN R. 897	7: National dust co	ontrol regulations.			
Impact:	CO ₂ emissions					
	Direct Impact: Th	e use of diesel o	perated construct	ion equipment will c	ause a contributing	
	factor the BCR Minerals (Pty) Ltd carbon footprint.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	4	5	50	
Post-Mitigation	4	1	2	4	28	

Mitigation Measures:	CO ₂ emissions and the release of noxious gasses can be <i>controlled</i> in the following ways:					
	(1) Develop and maintain a carbon footprint reporting policy;					
	2) Monitor the carbon footprint throughout the entire life cycle of the Spitsvale project;					
	(3) Develop and implement a hazardous substance management plan; and					
	(4) Reporting and recording incidents.					
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These					
	recommendations are included in Part B of this report.					
	GN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of					
	1965 stipulated a list of requirements in terms of regulating emissions form diesel operated					
	vehicles/plant/equipment.					

Activity:	23. Residue stockpiles					
Impact:	Dust Generation					
	Direct Impact: Co	ontinuous use of	haul roads often	leads to the general	tion of fugitive dust	
	comprising TSP, PM10 and PM2.5 from the dirt roads. Stockpiled residue is continuously					
	exposed to weather	ering leading the	generation of fir	e dust particles. The	generation of dust	
	during these activiti	ies will affect the v	visual environmer	nt negatively.		
	Indirect Impact: (Continuous expos	sure to high leve	ls of dust fallout may	lead to unhealthy	
	environment for em	ployees and surro	ounding commun	ties.		
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follo	wing ways:		
	(1) Development of	a dust fallout mo	nitoring and mana	agement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording incidents	s related to air qu	ality.		
	A number of recon	nmendation result	ed from the Air C	Quality Assessment (A	ppendix E). These	
	recommendations	are included in F	Part B of this re	oort. One of the reco	mmendations is to	
	develop a detailed	air quality manag	ement plan (foc	using on sources of d	ust located in close	
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ensu	uring adherence to	
	thresholds stipulat	ted in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)	
	(Appendix E) prior	to the commence	ement of operation	ns.		
	There are also a nu	ımber of legislativ	e requirements st	ipulated in the followir	ng regulations:	
	• GN R. 283	3: National reportin	ng regulations;			
	• GN R. 121	10: National Ambie	ent Air quality sta	ndards; and		

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• GN R. 897: National dust control regulations.

Activity:	24. Screening Ope	rations			
Impact:	Dust Generation				
	Direct Impact: So	creening operatio	ns poses a high	risk to the generati	ion of fugitive dust
	comprising TSP, P	M10 and PM2.5.	The generation	of dust during these	activities affects the
	visual environment	negatively.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	6	4	44
Mitigation Measures:	Fugitive dust gener	ration can be con t	trolled in the follo	wing ways:	
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;	
	(2) Frequent Inspec	ctions; and			
	(3) Reporting and r	ecording incidents	s related to air qua	ality.	
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These
	recommendations	are included in F	Part B of this rep	ort. One of the reco	ommendations is to
	develop a detailed	air quality manag	jement plan (focu	using on sources of d	ust located in close
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensi	uring adherence to
	thresholds stipulat	ted in the Base	eline Air Quality	Impact Assessmen	t report (BAQIAR)
	(Appendix E) prio	r to the commenc	ement of operatio	ns.	
	There are also a nu	umber of legislativ	e requirements st	pulated in the followir	ng regulations:
	• GN R. 283	3: National reporti	ng regulations;		
	• GN R. 12	10: National Ambi	ent Air quality star	ndards; and	
	• GN R. 897	7: National dust co	ontrol regulations.		
Impact:	CO ₂ emissions				
	Direct Impact: Th	e use of diesel of	perated construc	tion equipment will c	ause a contributing
	factor the BCR Min	erals (Pty) Ltd car	bon footprint.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	4	5	50
Post-Mitigation	4	1	2	4	28
Mitigation Measures:	CO ₂ emissions and	I the release of no	xious gasses can	be <i>controlled</i> in the	following ways:
	(1) Develop and ma	aintain a carbon fo	ootprint reporting p	oolicy;	
	(2) Monitor the cart	oon footprint throu	ghout the entire li	fe cycle of the Spitsva	ale project;
	(3) Develop and im	plement a hazard	ous substance ma	anagement plan; and	
	(4) Reporting and r	ecording incidents	S.		

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A number of recommendation resulted from the Air Quality Assessment (**Appendix E**). These recommendations are included in Part B of this report.

GN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of 1965 stipulated a list of requirements in terms of regulating emissions form diesel operated vehicles/plant/equipment.

Activity:	25. Discard disposa	al (backfilling of m	ining area)			
Impact:	Dust Generation					
	Direct Impact: Co	Direct Impact: Continuous use of haul roads and backfilling of material often leads to the				
	generation of fugitive	ve dust comprising	g TSP, PM10 and	PM2.5 from the dirt r	oads. Un-vegetated	
	area is continuous	sly exposed to w	eathering leadin	g the generation of	fine dust particles.	
	Backfilling of mater	rial in windy condi	tions also contrib	ute to dust generation	. The generation of	
	dust during these a	ctivities will affect	the visual enviror	nment negatively.		
	Indirect Impact: (Continuous expos	ure to high level	ls of dust fallout may	lead to unhealthy	
	environment for em	ployees and surro	ounding communi	ties.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	6	5	50	
Post-Mitigation	1	1	6	4	40	
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follo	wing ways:		
	(1) Development of	a dust fallout moi	nitoring and mana	agement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and re	ecording incidents	s related to air qua	ality.		
	A number of recom	nmendation result	ed from the Air C	Quality Assessment (A	ppendix E). These	
	recommendations	are included in F	Part B of this rep	oort. One of the reco	mmendations is to	
	develop a detailed	air quality manag	ement plan (foci	using on sources of d	ust located in close	
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ensu	uring adherence to	
	thresholds stipulat	ted in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)	
	(Appendix E) prior	to the commence	ement of operation	ns.		
	There are also a nu	umber of legislative	e requirements st	ipulated in the followir	ng regulations:	
	• GN R. 283	3: National reportir	ng regulations;			
	• GN R. 121	10: National Ambie	ent Air quality star	ndards; and		
	• GN R. 897	7: National dust co	ontrol regulations.			

Activity:	31. Vehicular activi	ty on haul roads;	and operation of m	nining equipment		
Impact:	Dust Generation					
	Direct Impact: Co	Direct Impact: Continuous use of haul road often leads to the generation of fugitive dust				
	comprising TSP, F	comprising TSP, PM10 and PM2.5 from the dirt roads. The generation of dust during these				
	activities will affect	the visual environ	ment negatively.			
	Indirect Impact: (Continuous expos	ure to high level	s of dust fallout may	/ lead to unhealthy	
	environment for em	nployees and surro	ounding communit	ies.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	4	45	
Mitigation Measures:	Fugitive dust gener	ration can be con t	trolled in the follow	wing ways:		
	(1) Development of	f a dust fallout mo	nitoring and mana	gement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording incidents	related to air qua	lity.		
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These	
	recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to	
	develop a detailed	air quality manag	ement plan (focu	ising on sources of d	ust located in close	
	proximity to the r	esidential recepto	ors within the pro	oject boundary) ensi	uring adherence to	
	thresholds stipula	ted in the Base	line Air Quality	Impact Assessmen	t report (BAQIAR)	
	(Appendix E) prior	to the commence	ement of operation	S.		
	There are also a nu	umber of legislativ	e requirements sti	pulated in the followir	ng regulations:	
	• GN R. 283	3: National reporti	ng regulations;			
	• GN R. 12	10: National Ambi	ent Air quality star	ndards; and		
	• GN R. 89	7: National dust co	ontrol regulations.			
Impact:	CO ₂ emissions					
	Direct Impact: Th	e use of diesel of	perated construc	tion equipment will c	ause a contributing	
	factor the BCR Min	erals (Pty) Ltd car	bon footprint.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	4	5	50	
Post-Mitigation	4	1	2	4	28	
Mitigation Measures:	CO ₂ emissions and	the release of no	xious gasses can	be <i>controlled</i> in the	following ways:	
	(1) Develop and ma	aintain a carbon fo	ootprint reporting p	policy;		
	(2) Monitor the carl	oon footprint throu	ghout the entire li	fe cycle of the Spitsva	ale project;	
	(3) Develop and im	plement a hazard	ous substance ma	nagement plan; and		
	(4) Reporting and r	ecording incidents	S.			

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A number of recommendation resulted from the Air Quality Assessment (**Appendix E**). These recommendations are included in Part B of this report.

GN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of 1965 stipulated a list of requirements in terms of regulating emissions form diesel operated vehicles/plant/equipment.

Activity:	32. Bulk transporting	ng of Ore to marke	et on Public roads		
Impact:	Dust Generation				
	Direct Impact: The	e use of public ro	ads without cover	ring loads with tarpau	lin may result in fly
	rock generating dua	st and causing da	mages to other roa	ad users.	
	Indirect Impact: (Continuous expos	ure to high level	s of dust fallout may	lead to unhealthy
	environment for em	ployees and surro	ounding communit	ies.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	4	5	55
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Fugitive dust gener	ation can be con t	trolled in the follow	wing ways:	
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;	
	(2) Frequent Inspec	ctions; and			
	(3) Reporting and r	ecording incidents	s related to air qua	ılity.	
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These
	recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to
	develop a detailed	air quality manag	ement plan (focu	ising on sources of d	ust located in close
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensu	uring adherence to
	thresholds stipulat	ed in the Base	line Air Quality	Impact Assessment	report (BAQIAR)
	(Appendix E) prior	to the commence	ement of operation	S.	
	There are also a nu	ımber of legislativ	e requirements sti	pulated in the followir	g regulations:
	• GN R. 283	3: National reporti	ng regulations;		
	• GN R. 12 ²	10: National Ambi	ent Air quality star	ndards; and	
	• GN R. 897	7: National dust co	ontrol regulations.		
Impact:	CO ₂ emissions				
	Direct Impact: Th	e use of diesel o	perated construct	tion equipment will c	ause a contributing
	factor the BCR Minerals (Pty) Ltd carbon footprint.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	4	5	55
Post-Mitigation	4	1	2	4	28

Aspect:

Environmental Impact Assessment Report and Environmental Management Programme report for The Spitsvale Mining Right Application and Associated Activities DMR ref: LP 30/5/1/2/3/2/1 (10104)

Mitigation Measures:	CO ₂ emissions and the release of noxious gasses can be <i>controlled</i> in the following ways:				
	(1) Develop and maintain a carbon footprint reporting policy;				
	(2) Monitor the carbon footprint throughout the entire life cycle of the Spitsvale project;				
	(3) Develop and implement a hazardous substance management plan; and				
	(4) Reporting and recording incidents.				
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These				
	recommendations are included in Part B of this report.				
	GN R. 1651 published in terms of section 39 of the Atmospheric Pollution Prevention Act of				
	1965 stipulated a list of requirements in terms of regulating emissions form diesel operated				
	vehicles/plant/equipment.				

Human Health and Safety

Activity:	17. Employment of	workers			
Impact:	Health and Safety	of employees			
	Direct Impact: Inc	reased demand f	or labour and em	ployees from differer	nt cultures may pose
	the risk to the lack	of knowledge a	nd skills on heal	th and safety in the v	vork place. Different
	human behaviours	deals with diffe	rent situations a	nd if there is not a	simplified system of
	managing health a	nd safety risk, sit	uations resulting	loss or injury of huma	an life may be a end
	result.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	6	5	55
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	The health and saf	ety of employees	can be <i>controlle</i>	d in the following way	S:
	(1) Develop and im	(1) Develop and implement a Health and Safety plan.			
	(2) All employees to	(2) All employees to be trained in health and safety in the work place.			
	(3) Develop and im	plement an emplo	oyee training prog	ıram.	
	(4) Keep and main	tain a record of all	training of emplo	yees.	

Activity:	19.Opencast mining excavations
Impact:	Dust Generation
	Direct Impact: Exposed un-vegetated mining areas may lead to high levels of dust fallout and
	will affect the overall air quality. The generation of dust during these activities will affect the
	visual environment negatively.
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy



	environment for employees and surrounding communities.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	6	5	55		
Post-Mitigation	4	1	4	4	36		
Mitigation Measures:	Fugitive dust gener	Fugitive dust generation can be <i>controlled</i> in the following ways:					
	(1) Development of	f a dust fallout m	onitoring and mar	nagement plan;			
	(2) Frequent Inspe	ctions; and					
	(3) Reporting and r	ecording incider	its related to air qu	uality.			
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These						
	recommendations	are included in	Part B of this re	eport. One of the r	ecommendations is to		
	develop a detailed	air quality mana	agement plan (fo	cusing on sources of	of dust located in close		
	proximity to the r	esidential recep	tors within the p	project boundary) e	ensuring adherence to		
	thresholds stipula	ted in the Bas	seline Air Qualit	y Impact Assessm	nent report (BAQIAR)		
	(Appendix E) prior	to the commen	cement of operation	ons.			
	There are also a nu	umber of legislat	ive requirements s	stipulated in the follo	wing regulations:		
	• GN R. 283	3: National repor	ting regulations;				
	• GN R. 12	10: National Amb	pient Air quality sta	andards; and			
	GN R. 897: Nationa	al dust control re	gulations.				

Activity:	20.Drilling & Blasting					
Impact:	Dust Generation	Dust Generation				
	Direct Impact: Du	ust being genera	ted form drilling	and blasting activities	s poses the risk of	
	affecting the an	nbient air qua	lity. This a	lso affects the vi	sual environment.	
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout may	lead to unhealthy	
	environment for em	ployees and surr	ounding commur	ities.		
Significance rating:	Duration	Ouration Extent Magnitude Probability Significance				
Pre-Mitigation	3	2	6	5	55	
Post-Mitigation	3	1	4	4	32	
Mitigation Measures:	Fugitive dust gener	ation can be <i>con</i>	trolled in the follo	owing ways:		
	(1) Development of	f a dust fallout mo	nitoring and man	agement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording incidents	s related to air qu	ality.		
	A number of recon	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These				
	recommendations	are included in F	Part B of this re	port. One of the reco	ommendations is to	
	develop a detailed	air quality manag	gement plan (foo	cusing on sources of d	ust located in close	

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proximity to the residential receptors within the project boundary) ensuring adherence to thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR) (Appendix E) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and

GN R. 897: National dust control regulations.

Impact: Damage to surrounding landowner properties

Direct Impact: Blasting outside the safe zones or in areas within close proximity to properties of landowner's poses a risk of damaging properties. Fly rock poses a human health and safety risk.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	2	6	3	36

Mitigation Measures:

Damages to surrounding landowners properties and personnel can be **avoided** in the following ways:

- (1) Develop and implement a Drilling and Blasting procedure.
- (2) Develop and implement a drilling and blasting monitoring plan.
- (3) Pre and post inspections of possible affected properties.
- (4) Record keeping of all drilling and blasting activities, clearly indicating time and date of blast.

Activity:	22. RoM & product	22. RoM & product stockpiling			
Impact:	Dust Generation				
	Direct Impact: Co	ontinuous use of	haul road often	leads to the genera	tion of fugitive dust
	comprising TSP, I	PM10 and PM2.	5 from the dirt	roads. Stockpiled Ro	M and product are
	continuously expo	sed to weatheri	ng leading the	generation of fine	dust particles. The
	generation of dus	st during these	activities will at	ffect the visual envir	ronment negatively.
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout mag	y lead to unhealthy
	environment for em	ployees and surr	ounding commur	nities.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	4	44
Mitigation Measures:	Fugitive dust generation can be <i>controlled</i> in the following ways:				
	(1) Development of	a dust fallout mo	nitoring and man	agement plan;	
	(2) Frequent Inspec	ctions; and			

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(3) Reporting and recording incidents related to air quality.

A number of recommendation resulted from the Air Quality Assessment (**Appendix E**). These recommendations are included in Part B of this report. One of the recommendations is to 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) (**Appendix E**.) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Activity:	23. Residue stockp	iles				
Impact:	Dust Generation					
	Direct Impact: Co	ontinuous use of	haul roads often	leads to the general	tion of fugitive dust	
	comprising TSP, F	PM10 and PM2.5	from the dirt ro	ads. Stockpiled resid	due is continuously	
	exposed to weather	ering leading the	generation of fine	e dust particles. The	generation of dust	
	during these	activities will	affect the	visual environ	ment negatively.	
	Indirect Impact: (Continuous expos	ure to high level	s of dust fallout may	lead to unhealthy	
	environment for em	ployees and surro	ounding communit	ties.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follow	wing ways:		
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording incidents	s related to air qua	ılity.		
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	appendix E). These	
	recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to	
	develop a detailed	air quality manag	ement plan (focu	ising on sources of d	ust located in close	
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensi	uring adherence to	
	thresholds stipulat	thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR)				
	(Appendix E.) prio	r to the commence	ement of operation	ns.		
	There are also a nu	ımber of legislativ	e requirements sti	pulated in the followir	ng regulations:	
	• GN R. 283	3: National reporti	ng regulations;			



- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Activity:	24. Screening Operations					
Impact:	Dust Generation					
	Direct Impact: So	creening operatio	ns poses a high	n risk to the genera	ation of fugitive dus	
	comprising TSP, PM10 and PM2.5. The generation of dust during these activities affects visual environment negatively.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Fugitive dust gener	ation can be con t	trolled in the follo	owing ways:		
	(1) Development of a dust fallout monitoring and management plan;					
	(2) Frequent Inspections; and					
	(3) Reporting and recording incidents related to air quality.					
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These					
	recommendations are included in Part B of this report. One of the recommendations is to					
	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)					
	(Appendix E.) prior to the commencement of operations.					
	There are also a number of legislative requirements stipulated in the following regulations:					
	GN R. 283: National reporting regulations;					
	• GN R. 12	0: National Ambi	ent Air quality sta	ndards; and		
	• GN R 897	7: National dust co	ontrol regulations			

Activity:	25. Discard disposal (backfilling of mining area)		
Impact:	Dust Generation		
	Direct Impact: Continuous use of haul roads and backfilling of material often leads to the		
	generation of fugitive dust comprising TSP, PM10 and PM2.5 from the dirt roads. Un-vegetated		
	areas are continuously exposed to weathering leading the generation of fine dust particles.		
	Backfilling of material in windy conditions also contribute to dust generation. The generation of		
	dust during these activities will affect the visual environment negatively.		
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy		
	environment for employees and surrounding communities.		



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Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	3	2	8	5	65			
Post-Mitigation	1	1	4	4	24			
Mitigation Measures:	Fugitive dust generation can be <i>controlled</i> in the following ways:							
	(1) Development of	f a dust fallout mo	nitoring and mana	agement plan;				
	(2) Frequent Inspec	ctions; and						
	(3) Reporting and r	ecording incidents	s related to air qua	ality.				
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These							
	recommendations	are included in F	Part B of this rep	oort. One of the red	commendations is to			
	develop a detailed	air quality manag	ement plan (foc	using on sources of	dust located in close			
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ens	suring adherence to			
	thresholds stipulat	ted in the Base	eline Air Quality	Impact Assessmen	nt report (BAQIAR)			
	(Appendix E.) prio	r to the commenc	ement of operatio	ns.				
	There are also a number of legislative requirements stipulated in the following regulations:							
	GN R. 283: National reporting regulations;							
	GN R. 1210: National Ambient Air quality standards; and							

GN R. 897: National dust control regulations.

Activity:	26. Waste generation, storage and disposal					
Impact:	Illegal dumping					
	Direct Impact: D	umping of gene	erated water in	areas other than is	approved by the	
	authorisation or EM	IP poses a high	risk of polluting nu	umerous sources i.e.	Water and soil. The	
	dumping of genera	l waste poses a c	choking risk to gra	zing animals. Hazard	ous Leachates from	
	illegal dumps a	lso poses a	risk to the	health of surround	ding communities.	
	Indirect Impact:	The hazardous le	eachate from the	waste storage facilit	ies poses a risk of	
	contaminating both	surface and sub	-surface water as	well as soil resource	es. This may lead to	
	the degradation of	conditions for the	aquatic ecology to	thrive.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Illegal dumping can	be avoided in th	e following ways:	1		
	(1) Develop and in	(1) Develop and implement as waste management plan with the focus on reuse, reduce,				
	recycle, or avoid.					
	(2) Development ar	nd maintenance o	f a waste disposa	I record keeping syste	em.	



Activity:	27. Chemical Toilets							
Impact:	Smell nuisance							
	Direct Impact: Lac	ck of maintenance	and treatment m	ay result in a smelling	environment.			
Significance rating:	Duration	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	1	1	6	5	40			
Post-Mitigation	1	1	4	4	24			
Mitigation Measures:	The generation of s	smell from the PCI	D's can be <i>avoid</i>	ed in the following way	/S:			
	(1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP).							
	(2) Frequent inspections of areas posing a possible risk of causing smell nuisance.							
	(3) Development a	nd implementation	of an incident re	sponse plan.				

	y on naurroads, c	and operation of	mining equipment	
Dust Generation				
Direct Impact: Co	ntinuous use of	haul road often	leads to the generat	ion of fugitive dust
comprising TSP, P	M10 and PM2.5	from the dirt roa	ads. The generation o	f dust during these
activities will affect	the visual environ	ment negatively.		
Indirect Impact: C	Continuous expos	ure to high leve	ls of dust fallout may	lead to unhealthy
environment for em	ployees and surro	ounding commun	ities.	
Duration	Extent	Magnitude	Probability	Significance
4	2	6	5	60
4	1	4	4	36
Fugitive dust generation	ation can be <i>cont</i>	trolled in the follo	wing ways:	
(1) Development of	a dust fallout moi	nitoring and mana	agement plan;	
(2) Frequent Inspec	tions; and			
(3) Reporting and re	ecording incidents	s related to air qu	ality.	
A number of recom	mendation result	ed from the Air (Quality Assessment (A	ppendix E). These
recommendations a	are included in F	Part B of this re	port. One of the reco	mmendations is to
develop a detailed	air quality manag	ement plan (foc	using on sources of d	ust located in close
proximity to the re	esidential recepto	ors within the pr	roject boundary) ensu	uring adherence to
thresholds stipulate	ed in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)
(Appendix E.) prior	to the commence	ement of operation	ons.	
There are also a nu	mber of legislative	e requirements s	tipulated in the followir	ng regulations:
• GN R. 283	: National reportir	ng regulations;		
• GN R. 121	0: National Ambie	ent Air quality sta	ndards; and	
• GN R. 897	: National dust co	ontrol regulations		
	Direct Impact: Cocomprising TSP, Pactivities will affect Indirect Impact: Coenvironment for em Duration 4 Fugitive dust general (1) Development of (2) Frequent Inspect (3) Reporting and reach A number of recomprecommendations and develop a detailed proximity to the reach thresholds stipulate (Appendix E.) prior There are also a number of R. 283 GN R. 283	Direct Impact: Continuous use of comprising TSP, PM10 and PM2.5 activities will affect the visual environ Indirect Impact: Continuous exposenvironment for employees and surround Extent 4 2 4 1 Fugitive dust generation can be content (1) Development of a dust fallout most (2) Frequent Inspections; and (3) Reporting and recording incidents A number of recommendation result recommendations are included in Fedevelop a detailed air quality manage proximity to the residential receptor thresholds stipulated in the Base (Appendix E.) prior to the commence (Appendix E.) prior to the commence of the commenc	Direct Impact: Continuous use of haul road often comprising TSP, PM10 and PM2.5 from the dirt road activities will affect the visual environment negatively. Indirect Impact: Continuous exposure to high lever environment for employees and surrounding communation	Direct Impact: Continuous use of haul road often leads to the generated comprising TSP, PM10 and PM2.5 from the dirt roads. The generation of activities will affect the visual environment negatively. Indirect Impact: Continuous exposure to high levels of dust fallout may environment for employees and surrounding communities. Duration Extent Magnitude Probability 4 2 6 5 4 1 4 4 Fugitive dust generation can be controlled in the following ways: (1) Development of a dust fallout monitoring and management plan; (2) Frequent Inspections; and (3) Reporting and recording incidents related to air quality. A number of recommendation resulted from the Air Quality Assessment (A recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendation are included in Part B of this report. One of the recommendation are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report. One of the recommendations are included in Part B of this report.

Activity:	32. Bulk transporting of Ore to market on Public roads						
Impact:	Dust Generation						
	Direct Impact: The	Direct Impact: The use of public roads without covering loads with tarpaulin may result in fly					
	rock generating dus	st and causing da	mages to other ro	oad users.			
	Indirect Impact: (Continuous expos	sure to high leve	ls of dust fallout may	y lead to unhealthy		
	environment for em	ployees and surro	ounding commun	ities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	3	8	5	75		
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	Fugitive dust gener	ation can be con t	trolled in the follo	wing ways:			
	(1) Development of	a dust fallout mo	nitoring and mana	agement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and re	ecording incidents	s related to air qu	ality.			
	A number of recom	nmendation result	ed from the Air C	Quality Assessment (A	Appendix E). These		
	recommendations	are included in F	Part B of this re	port. One of the reco	ommendations is to		
	develop a detailed	air quality manag	gement plan (foc	using on sources of d	lust located in close		
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ensi	uring adherence to		
	thresholds stipulat	ted in the Base	eline Air Quality	Impact Assessmen	t report (BAQIAR)		
	(Appendix E.) prior	r to the commenc	ement of operation	ons.			
	There are also a nu	ımber of legislativ	e requirements s	tipulated in the followir	ng regulations:		
	• GN R. 283	3: National reporti	ng regulations;				
	• GN R. 121	10: National Ambi	ent Air quality sta	ndards; and			
	• GN R. 897	7: National dust co	ontrol regulations.				

Aspect:	pect: Topography and Visual Environment
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Activity:	18.Topsoil and subsoil stripping & stockpiling for mining operation area					
Impact:	Dust generation					
	Direct Impact: Clearing of vegetation for topsoil and subsoil stripping exposes the mining					
	operation area to dust generation. High levels of dust fallout will affect the overall air quality.					
	The generation of dust during these activities will affect the visual environment negatively.					
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy					
	environment for employees and surrounding communities.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	4	5	50	



Post-Mitigation	2							
Mitigation Measures:	Fugitive dust generation can be <i>controlled</i> in the following ways:							
	(1) Development of	(1) Development of a dust fallout monitoring and management plan;						
	(2) Frequent Inspec	ctions; and						
	(3) Reporting and r	ecording incidents	s related to air qua	ılity.				
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	Appendix E). These			
	recommendations	are included in F	Part B of this rep	ort. One of the reco	ommendations is to			
	develop a detailed	air quality manag	ement plan (focu	using on sources of o	lust located in close			
	proximity to the r	esidential recepto	ors within the pro	oject boundary) ens	uring adherence to			
	thresholds stipula	ted in the Base	line Air Quality	Impact Assessmen	t report (BAQIAR)			
	(Appendix E.) prio	r to the commence	ement of operation	ns.				
	There are also a nu	umber of legislativ	e requirements sti	pulated in the following	ng regulations:			
	• GN R. 283	3: National reporti	ng regulations;					
	• GN R. 12	GN R. 1210: National Ambient Air quality standards; and						
	• GN R. 897	7: National dust co	ontrol regulations.					
Impact:	Alteration of the v	risual environme	nt and topograph	ny				
	Direct Impact: To	psoil and subsoil	stripping will alter	the topography and	l visual environment			
	throughout the min	ing operation.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	4	5	50			
Post-Mitigation	4	1	4	4	36			
Mitigation Measures:	The affects of alter	ing the topograph	y caused by vege	tation clearance and	topsoil stripping can			
	be <i>remedied</i> in the following ways:							
	(1) Record keeping	g of the topograpl	hy and environme	ental state before the	e commencement of			
	any activities.							
	(2) Development of	f rehabilitation plai	n.					

Activity:	19.Opencast mining excavations				
Impact:	Dust generation				
	Direct Impact: Exposed un-vegetated mining areas may lead to high levels of dust fallout and				
	will affect the overall air quality. The generation of dust during these activities will affect the				
	visual environment negatively.				
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy				
	environment for employees and surrounding communities.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance



Pre-Mitigation	4	4 2 6 5 60						
Post-Mitigation	4 2 4 4 40							
Mitigation Measures:	Fugitive dust gener	ration can be con t	trolled in the follow	wing ways:				
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;				
	(2) Frequent Inspec	ctions; and						
	(3) Reporting and r	ecording incidents	s related to air qua	ality.				
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These			
	recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to			
	develop a detailed	air quality manag	jement plan (focu	using on sources of d	ust located in close			
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensu	uring adherence to			
	thresholds stipulat	ted in the Base	eline Air Quality	Impact Assessment	t report (BAQIAR)			
	(Appendix E.) prio	r to the commenc	ement of operation	ns.				
	There are also a nu	umber of legislativ	e requirements sti	pulated in the following	g regulations:			
	• GN R. 283	3: National reporti	ng regulations;					
	• GN R. 12 ⁷	10: National Ambi	ent Air quality star	ndards; and				
	• GN R. 897	7: National dust co	ontrol regulations.					
Impact:	Alteration of the v	isual environme	nt and topograph	ıy				
	Direct Impact: Op	en cast mining w	ill alter the topogr	aphy and visual envi	ronment throughout			
	the mining operation	n in a significant v	vay.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	10	5	80			
Post-Mitigation	4	1	6	5	55			
Mitigation Measures:	The affects of alter	ing the topograph	y caused by vege	tation clearance and t	opsoil stripping can			
	be <i>remedied</i> in the	be <i>remedied</i> in the following ways:						
	(1) Record keeping	g of the topograp	hy and environme	ental state before the	commencement of			
	any activities.							
	(2) Development of	rehabilitation pla	n.					

Activity:	20.Drilling & Blasting					
Impact:	Dust generation					
	Direct Impact: Du	ıst being generat	ed form drilling a	and blasting activities	s poses the risk of	
	affecting the an	nbient air qual	lity. This als	so affects the vi	sual environment.	
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy					
	environment for employees and surrounding communities.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	



Pre-Mitigation	3	2	4	5	45			
Post-Mitigation	3	1	4	4	32			
Mitigation Measures:	Fugitive dust gener	ation can be cont	rolled in the follow	wing ways:				
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;				
	(2) Frequent Inspec	ctions; and						
	(3) Reporting and r	ecording incidents	related to air qua	ility.				
	A number of recon	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These						
	recommendations are included in Part B of this report. One of the recommendations is to							
	develop a detailed	air quality manag	gement plan (focu	sing on sources of d	ust located in close			
	proximity to the re	esidential recepto	ors within the pro	oject boundary) ensu	uring adherence to			
	thresholds stipulat	ted in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)			
	(Appendix E.) prio	r to the commence	ement of operatior	าร.				
	There are also a nu	umber of legislative	e requirements sti	pulated in the followin	ng regulations:			
	• GN R. 283	GN R. 283: National reporting regulations;						
	• GN R. 12 ⁴	10: National Ambie	ent Air quality stan	ndards; and				
	• GN R. 897	7: National dust co	entrol regulations.					

Activity:	22. RoM & product	stockpiling			
Impact:	Dust generation				
	Direct Impact: Co	ontinuous use of	haul road often l	eads to the generat	ion of fugitive dust
	comprising TSP, I	PM10 and PM2.5	from the dirt ro	oads. Stockpiled Rol	M and product are
	continuously expo	sed to weathering	ng leading the	generation of fine o	lust particles. The
	generation of dus	t during these	activities will affe	ect the visual envir	onment negatively.
	Indirect Impact: (Continuous expos	sure to high level	s of dust fallout may	lead to unhealthy
	environment for em	ployees and surro	ounding communit	ies.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	4	36
Mitigation Measures:	Fugitive dust gener	ation can be con t	trolled in the follow	wing ways:	
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;	
	(2) Frequent Inspec	ctions; and			
	(3) Reporting and r	ecording incidents	s related to air qua	lity.	
	A number of recon	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These
	recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to

	proximity to the r	esidential recep	tors within the p	project boundary) er	nsuring adherence to		
	thresholds stipula	thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR)					
	(Appendix E.) prio	r to the commen	cement of operati	ons.			
	There are also a nu	umber of legislati	ve requirements	stipulated in the follow	wing regulations:		
	• GN R. 28	3: National report	ting regulations;				
	• GN R. 12	10: National Amb	pient Air quality sta	andards; and			
	• GN R. 89	7: National dust o	control regulations	S.			
Impact:	Alteration of the v	risual environm	ent and topogra	phy			
	Direct Impact: Sto	ockpiles of RoM a	and product mater	rial over an extended	time potentially alters		
	the topography and visual environment.						
	the topography and	d visual environm	nent.				
Significance rating:	the topography and Duration	d visual environm	ment. Magnitude	Probability	Significance		
Significance rating: Pre-Mitigation		1		Probability 5	Significance		
	Duration	Extent	Magnitude	•			
Pre-Mitigation	Duration 4	Extent 2	Magnitude 10 6	5 5	80		
Pre-Mitigation Post-Mitigation	Duration 4	Extent 2 1 ing the topograp	Magnitude 10 6 hy caused by veg	5 5	80 55		
Pre-Mitigation Post-Mitigation	Duration 4 4 The affects of alter be <i>remedied</i> in the	Extent 2 1 ing the topograp e following ways:	Magnitude 10 6 hy caused by veg	5 5 jetation clearance an	80 55		
Pre-Mitigation Post-Mitigation	Duration 4 4 The affects of alter be <i>remedied</i> in the	Extent 2 1 ing the topograp e following ways:	Magnitude 10 6 hy caused by veg	5 5 jetation clearance an	80 55 d topsoil stripping can		

Activity:	23. Residue stockp	23. Residue stockpiles				
Impact:	Dust generation	Dust generation				
	Direct Impact: Co	ontinuous use of	haul roads often	leads to the general	tion of fugitive dust	
	comprising TSP, F	PM10 and PM2.5	from the dirt ro	oads. Stockpiled resid	due is continuously	
	exposed to weather	ering leading the	generation of fin	e dust particles. The	generation of dust	
	during these	activities will	affect the	visual environ	ment negatively.	
	Indirect Impact: (Continuous expos	sure to high level	s of dust fallout may	y lead to unhealthy	
	environment for em	ployees and surr	ounding communi	ties.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Fugitive dust gener	ation can be con	trolled in the follo	wing ways:		
	(1) Development of	f a dust fallout mo	nitoring and mana	igement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	ecording incidents	s related to air qua	ality.		
	A number of recon	nmendation result	ed from the Air C	Quality Assessment (A	Appendix E). These	

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recommendations are included in Part B of this report. One of the recommendations is to 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) (Appendix E.) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Impact: Alteration of the visual environment and topography

Direct Impact: Stockpiles of residue material over an extended time potentially alters the topography and visual environment.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	10	5	80
Post-Mitigation	4	1	6	5	55

Mitigation Measures:

The affects of altering the topography caused by vegetation clearance and topsoil stripping can be *remedied* in the following ways:

- (1) Record keeping of the topography and environmental state before the commencement of any activities.
- (2) Development of rehabilitation plan.

Activity:	24. Screening Ope	24. Screening Operations				
Impact:	Dust generation					
	Direct Impact: So	creening operatio	ns poses a high	risk to the generati	ion of fugitive dust	
	comprising TSP, P	M10 and PM2.5.	The generation	of dust during these a	activities affects the	
	visual environment	negatively.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Fugitive dust gener	ation can be con t	trolled in the follo	wing ways:		
	(1) Development of	a dust fallout mo	nitoring and mana	agement plan;		
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	(3) Reporting and recording incidents related to air quality.				
	A number of recon	nmendation result	ed from the Air C	Quality Assessment (A	ppendix E). These	
	recommendations	are included in F	Part B of this rep	oort. One of the reco	mmendations is to	

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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) (**Appendix E**.) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Activity:	25. Discard disposa	al (backfilling of m	ining area)		
Impact:	Dust generation				
	Direct Impact: Co	ontinuous use of	haul roads and l	backfilling of material	often leads to the
	generation of fugitive	ve dust comprisino	g TSP, PM10 and	PM2.5 from the dirt r	oads. Un-vegetated
	areas are continuo	ously exposed to	weathering leadi	ng the generation of	fine dust particles.
	Backfilling of mater	rial in windy condi	tions also contrib	ute to dust generation	n. The generation of
	dust during these a	ctivities will affect	the visual enviror	nment negatively.	
	Indirect Impact: (Continuous expos	ure to high level	s of dust fallout may	lead to unhealthy
	environment for em	ployees and surro	ounding communi	ties.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	6	5	65
Post-Mitigation	1	1	4	4	24
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follo	wing ways:	
	(1) Development of	a dust fallout moi	nitoring and mana	agement plan;	
	(2) Frequent Inspec	ctions; and			
	(3) Reporting and re	ecording incidents	s related to air qua	ality.	
	A number of recom	nmendation result	ed from the Air C	Quality Assessment (A	appendix E). These
	recommendations	are included in F	Part B of this rep	oort. One of the reco	mmendations is to
	develop a detailed	air quality manag	ement plan (foci	using on sources of d	ust located in close
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ensu	uring adherence to
	thresholds stipulat	ted in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)
	(Appendix E.) prio	r to the commence	ement of operatio	ns.	
	There are also a nu	ımber of legislativ	e requirements st	ipulated in the followir	ng regulations:
	• GN R. 283	3: National reportir	ng regulations;		
	• GN R. 121	10: National Ambie	ent Air quality star	ndards; and	
	• GN R. 897	7: National dust co	ontrol regulations.		

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Activity:	31. Vehicular activi	ty on haul roads;	and operation		
Impact:	Dust generation				
	Direct Impact: Co	ontinuous use of	haul road ofter	leads to the generat	ion of fugitive dust
	comprising TSP, F	M10 and PM2.5	from the dirt ro	ads. The generation o	f dust during these
	activities will affect	the visual environ	ment negatively		
	Indirect Impact: (Continuous expos	sure to high leve	els of dust fallout may	/ lead to unhealthy
	environment for em	nployees and surr	ounding commur	nities.	•
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	5	45
Mitigation Measures:	Fugitive dust gener	ration can be <i>con</i>	trolled in the foll	owing ways:	
	(1) Development of	f a dust fallout mo	nitoring and mar	nagement plan;	
	(2) Frequent Inspec	ctions; and			
	(3) Reporting and r	ecording incidents	s related to air qu	uality.	
	A number of recon	nmendation result	ed from the Air	Quality Assessment (A	appendix E). These
	recommendations	are included in F	Part B of this re	eport. One of the reco	ommendations is to
	develop a detailed	air quality manag	gement plan (fo	cusing on sources of d	ust located in close
	proximity to the re	esidential recepto	ors within the p	project boundary) ensi	uring adherence to
	thresholds stipulat	ted in the Base	eline Air Qualit	y Impact Assessmen	t report (BAQIAR)
	(Appendix E.) prio	r to the commenc	ement of operati	ons.	
	There are also a nu	umber of legislativ	e requirements s	stipulated in the followir	ng regulations:
	• GN R. 283	3: National reporti	ng regulations;		
	• GN R. 12 ⁻	10: National Ambi	ent Air quality sta	andards; and	
		7: National dust co			

Activity:	32. Bulk transporting of Ore to market on Public						
Impact:	Dust generation						
	Direct Impact: The	Direct Impact: The use of public roads without covering loads with tarpaulin may result in fly					
	rock generating due	st and causing d	amages to other r	oad users.			
	Indirect Impact: (Continuous expo	sure to high leve	els of dust fallout may	y lead to unhealthy		
	environment for em	environment for employees and surrounding communities.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	3	4	5	55		
Post-Mitigation	4	4 1 2 4 28					
Mitigation Measures:	Fugitive dust gener	ation can be co	ntrolled in the foll	owing ways:			

Aspect:

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- (1) Development of a dust fallout monitoring and management plan;
- (2) Frequent Inspections; and
- (3) Reporting and recording incidents related to air quality.

A number of recommendation resulted from the Air Quality Assessment (**Appendix E**). These recommendations are included in Part B of this report. One of the recommendations is to 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) (**Appendix E**.) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

Surface Water quality

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

18.Topsoil and sub	soil stripping & st	ockpiling for minir	ng operation area	
Hydrocarbon Con	tamination			
Direct Impact: Thr	oughout the oper	ational phase cor	nstruction equipment a	re used. This poses
a risk of hydrocarb	on spills if equipn	nent are not mair	ntained. Depending on	the size of the spill
the level of conta	mination may va	ary from insignif	icant to significant a	nd may affect the
surrounding water	quality (both surfa	ice and sub-surfa	ce) as well as the soil	quality.
Duration	Extent	Magnitude	Probability	Significance
4	2	8	5	70
4	2	6	3	36
Potential impact re	sulting from hydr	ocarbon contami	nation can be <i>control</i>	led in the following
ways:				
(1) Develop and im	plement a Hazar	dous substances	management plan spe	ecifically addressing
handling, storage, a	and transport of h	azardous substar	nces.	
(2) Develop and in	nplement an eme	ergency response	e procedure addressir	ng the procedure in
case of a chemical	spill. This procee	dure should ensu	re the fastest possible	reaction to spills or
accidents as well a	s addressing rem	ediation procedur	es.	
	-	•		
. ,	·		. •	
Direct Impact: Stri	pping topsoil and	subsoil or stockp	iling material through	or in close proximity
	Hydrocarbon Com Direct Impact: Three a risk of hydrocarbon the level of contant surrounding water of the level of the level of contant surrounding water of the level of the leve	Hydrocarbon Contamination Direct Impact: Throughout the oper a risk of hydrocarbon spills if equipment the level of contamination may versurrounding water quality (both surface) Duration Extent 4 2 Potential impact resulting from hydroways: (1) Develop and implement a Hazard handling, storage, and transport of he (2) Develop and implement an emercase of a chemical spill. This process accidents as well as addressing reme (3) Development and implementation Sedimentation and siltation of water the process of the contemporary of the contem	Hydrocarbon Contamination Direct Impact: Throughout the operational phase cora risk of hydrocarbon spills if equipment are not main the level of contamination may vary from insignif surrounding water quality (both surface and sub-surface) Duration Extent Magnitude 4 2 8 4 2 6 Potential impact resulting from hydrocarbon contaminates: (1) Develop and implement a Hazardous substances handling, storage, and transport of hazardous substances handling, storage, and implement an emergency response case of a chemical spill. This procedure should ensuraccidents as well as addressing remediation procedure (3) Development and implementation of an incident response to the substance of the subst	Direct Impact: Throughout the operational phase construction equipment at a risk of hydrocarbon spills if equipment are not maintained. Depending on the level of contamination may vary from insignificant to significant a surrounding water quality (both surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as the soil of the surface and sub-surface) as well as a surface and sub-surface) as well as addressing remediation procedures. (3) Development and implementation of an incident reporting procedure.

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

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	to drainage lines may cause sedimentation and siltation of watercourses if not managed					
	properly.					
	Indirect Impact: Storm water runoff of dirt roads and un-vegetated areas may cause					
	sedimentation and	siltation of nearby	watercourses.	-	•	
Significance rating:	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	2	6	3	36	
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the following	g ways:		
	1) Development an	d implementation	of water quality m	onitoring plan.		
	(2) Reporting and r	ecording incidents	S.			
Impact:	Water level reduct	tion and contami	nation			
	Direct Impact: The	e reduction in wa	ter levels as well	as contamination of	the water resource	
	that may be cause	ed by alternating	the topography of	luring site clearing a	nd topsoil stripping	
	poses a risk to affe	ecting the surface	and sub-surface	water quality as well	as the downstream	
	users.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	3	6	5	65	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the s	surface water quality of	can be controlled in	
	following ways:					
	(1) Development ar	nd implementation	of water quality n	nonitoring plan.		
	(2) Development of	a storm water ma	anagement plan.			
	(3) Reporting and r	ecording incidents	S.			
	(4) Create awarene	ess of water conse	ervation.			
Impact:	Alteration of drain	age patterns				
	Indirect Impact:	Alteration of the	e drainage patte	erns may lead to t	he degradation of	
	downstream or sur	rounding Wetland	s which in its turn	may affect the aquat	ic micro and macro	
	ecology.					
	Direct Impact: Si	te clearing and t	opsoil stripping tl	hrough drainage line	s may lead to the	
	siltation of streams	as well as lead t	o erosion along th	ne river banks that wi	Il affect the surface	
	water quality negatively.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	3	8	5	80	
Post-Mitigation	4	2	6	4	48	
Mitigation Measures:	The effects on sur	face water quality	resulting from th	e alteration in draina	ge patterns can be	

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

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	remedied in the fol	llowing ways:				
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and rep	(2) Record and report all incidents related to affecting water quality.				
	(3) Develop a reha	abilitation plan spe	ecifically address	ing the rehabilitation i	measures related to	
	reinstatement of dr	ainage lines.				
Impact:	Destruction of up	stream tributarie	s and reduction	in water in the catch	ment	
	Indirect Impact: /	Alteration of the	upstream draina	ge lines may lead to	the degradation of	
	downstream or sur	rounding Wetland	ls which in its tur	n may affect the aqua	tic micro and macro	
	ecology.					
	Direct Impact: The	e destruction of tri	butaries may lea	d to a limited volume	of water available to	
	the downstream us	sers. The reductio	n in water in the	catchment may cause	e the degradation of	
	surface water quali	ty.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	3	6	5	70	
Post-Mitigation	4	1	4	4	36	
Mitigation Measures:	The effects on surf	face water quality	resulting from the	ne destruction of upsti	ream tributaries and	
	reduction in water i	n the catchment o	can be <i>remedied</i>	in the following ways:		
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.		
	(3) Develop a reha	abilitation plan spe	ecifically address	ing the rehabilitation i	measures related to	
	reinstatement of dr	ainage lines.				

Activity:	19.Opencast minin	19.Opencast mining excavations				
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: Thr	oughout the oper	ational phase con	struction equipment a	re used. This poses	
	a risk of hydrocarb	on spills if equip	ment is not mainta	ained. Depending on	the size of the spill	
	the level of conta	amination may v	ary from insignifi	cant to significant a	nd may affect the	
	surrounding water	quality (both surfa	ce and sub-surfac	ce) as well as the soil	quality.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamir	nation can be control	lled in the following	
	ways:					
	(1) Develop and im	nplement a Hazar	dous substances i	management plan spe	ecifically addressing	
	handling, storage, a	and transport of h	azardous substan	ces.		

- saksonments.					
	(2) Develop and implement an emergency response procedure addressing the procedure in				
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing remo	ediation procedure	es.	
	(3) Development and implementation of an incident reporting procedure.				
Impact:	Sedimentation an	d siltation of wat	ercourses		
	Direct Impact: Stri	pping topsoil and	subsoil or stockpi	ling material through	or in close proximity
	to drainage lines	may cause sedir	mentation and si	Itation of watercours	es if not managed
	properly.				
	Indirect Impact:	Storm water rur	off of dirt roads	s and un-vegetated	areas may cause
	sedimentation and	siltation of nearby	watercourses.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	8	5	75
Post-Mitigation	4	2	6	4	48
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the followin	g ways:	
	1) Development and implementation of water quality monitoring plan.				
	(2) Reporting and recording incidents.				
Impact:	Contamination of	water resource			
	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants				
	are used such as h	igh levels of nitrat	tes. Improper mar	nagement of potential	pollutants may lead
	to the degradation of water quality (both surface and sub-surface). Polluted water resources				
	may affect the aqua	atic environment i	n a detrimental ma	anner.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	he following ways:	
	(1) Development a	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water i	management plan.	
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed p	rocedure.
	(5) Develop and im	plement an emero	gency preparedne	ss plan.	
Impact:	Alteration of drain	•			
	-		• .	erns may lead to t	•
		rounding Wetland	s which in its turn	may affect the aqua	tic micro and macro
	ecology.				

	Direct Impact: Si	te clearing and t	opsoil stripping t	hrough drainage line	es may lead to the	
	siltation of streams	siltation of streams as well as lead to erosion along the river banks that will affect the surface				
	water quality negat	water quality negatively.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	5	3	8	5	80	
Post-Mitigation	4	2	6	5	60	
Mitigation Measures:	The effects on sur	face water quality	resulting from the	ne alteration in draina	age patterns can be	
	remedied in the fol	llowing ways:				
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.		
	(3) Develop a reha	abilitation plan spe	ecifically addressi	ng the rehabilitation	measures related to	
	reinstatement of dr	ainage lines.				
Impact:	Destruction of up	stream tributarie	s and reduction	in water in the catch	nment	
	Indirect Impact: /	Indirect Impact: Alteration of the upstream drainage lines may lead to the degradation of				
	downstream or sur	rounding Wetland	s which in its turr	n may affect the aqua	tic micro and macro	
	ecology.					
	Direct Impact: The destruction of tributaries may lead to a limited volume of water available to				of water available to	
	the downstream users. The reduction in water in the catchment may cause the degradation of					
	surface water quali	ty.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	3	6	5	65	
Post-Mitigation	4	1	6	4	44	
Mitigation Measures:	The effects on sur	face water quality	resulting from th	e destruction of upst	ream tributaries and	
	reduction in water i	n the catchment o	an be <i>remedied</i> i	n the following ways:		
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.		
	(3) Develop a reha	abilitation plan spe	ecifically addressi	ng the rehabilitation	measures related to	
	reinstatement of dr	ainage lines.				

Activity:	20.Drilling & Blasting
Impact:	Hydrocarbon Contamination
	Direct Impact: Throughout the operational phase construction equipment are used. This poses
	a risk of hydrocarbon spills if equipment is not maintained. Depending on the size of the spill
	the level of contamination may vary from insignificant to significant and may affect the
	surrounding water quality (both surface and sub-surface) as well as the soil quality.



Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be control	led in the following
	ways:				
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing
	handling, storage, a	and transport of ha	azardous substand	ces.	
	(2) Develop and in	nplement an eme	ergency response	procedure addressin	g the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing reme	ediation procedure	es.	
	(3) Development ar	nd implementation	of an incident rep	oorting procedure.	
Impact:	Contamination of	water resource			
	Direct Impact: Thr	oughout the oper	ational phase of th	ne mining operations,	potential pollutants
	are used such as h	igh levels of nitrat	tes. Improper man	agement of potential	pollutants may lead
	to the degradation	of water quality	(both surface and	l sub-surface). Pollute	ed water resources
	may affect the aqua	may affect the aquatic environment in a detrimental manner.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water r	nanagement plan.	
	(4) Reporting and re	ecording all relate	d incidents accord	ling to a developed pr	ocedure.
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.	

Activity:	21. RoM & product stockpiling				
Impact:	Hydrocarbon Contamination				
	Direct Impact: Throughout the operational phase equipment and plant are used to transport				
	and stockpile RoM and product. This poses a risk of hydrocarbon spills if equipment are not				
	maintained. Depending on the size of the spill the level of contamination may vary from				
	insignificant to significant and may affect the surrounding water quality (both surface and sub-				
	surface) as well as the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance



Pre-Mitigation	4	1	8	5	65	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	lled in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances r	nanagement plan spe	ecifically addressing	
	handling, storage,	handling, storage, and transport of hazardous substances.				
	(2) Develop and ir	nplement an eme	ergency response	procedure addressin	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensure	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing remo	ediation procedure	es.		
	(3) Development a	nd implementation	of an incident rep	orting procedure.		
Impact:	Contamination of	water resource				
	Direct Impact: The	oughout the oper	ational phase of th	ne mining operations,	potential pollutants	
	are used such as h	igh levels of nitra	es. Improper man	agement of potential	pollutants may lead	
	to the degradation	of water quality	(both surface and	sub-surface). Pollute	ed water resources	
	may affect the aqua	atic environment i	n a detrimental ma	nner.		
	Indirect Impact: S	Sub-surface mater	ial and ore expos	ed to weathering may	y release pollutants	
	to the water resour	ces.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
D., M'4' 4'	4	•	0	F	70	
Pre-Mitigation	4	2	8	5	70	
Pre-Mitigation Post-Mitigation	4	1	6	3	33	
		1	6	3		
Post-Mitigation	4	1 vater resources ca	6 n be avoided in th	3 ne following ways:		
Post-Mitigation	4 Contamination of w (1) Development at (2) Development a	1 vater resources cand implementation	6 n be avoided in the of a water monitor	3 ne following ways:	33	
Post-Mitigation	4 Contamination of w (1) Development an	1 vater resources cand implementation	6 n be avoided in the of a water monitor	3 ne following ways: oring program.	33	
Post-Mitigation	4 Contamination of w (1) Development at (2) Development a	1 vater resources cand implementation and implementation	6 n be avoided in the of a water monitor of an Integrate	3 ne following ways: oring program. ed Water and Waste	33	
Post-Mitigation	4 Contamination of w (1) Development as (2) Development as (IWWMP). (3)Development an (4) Reporting and r	ater resources cand implementation and implementation dimplementation ecording all relate	6 n be avoided in the of a water monitor of an Integrate of a storm water red incidents according to the control of the cont	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed pr	33 Management Plan	
Post-Mitigation Mitigation Measures:	4 Contamination of w (1) Development as (2) Development as (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im	1 vater resources cand implementation and implementation dimplementation ecording all relate plement an emergent	6 n be avoided in the of a water monitor of an Integrate of a storm water red incidents according preparedness	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed pr	33 Management Plan	
Post-Mitigation	4 Contamination of w (1) Development as (2) Development as (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im Sedimentation an	ater resources cand implementation and implementation dimplementation ecording all relate plement an emerged siltation of wat	n be avoided in the of a water monitor of an Integrate of a storm water red incidents according preparedness ercourses	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed press plan.	Management Plan	
Post-Mitigation Mitigation Measures:	Contamination of w (1) Development at (2) Development at (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im Sedimentation an Direct Impact: Sto	ater resources cand implementation and implementation dimplementation ecording all related plement an emerged siltation of wat ackpiling RoM and	n be avoided in the of a water monitor of an Integrate of a storm water red incidents according product material	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed press plan. through or in close press	Management Plan rocedure.	
Post-Mitigation Mitigation Measures:	Contamination of w (1) Development at (2) Development at (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im Sedimentation an Direct Impact: Sto	ater resources cand implementation and implementation dimplementation ecording all relate plement an emerged siltation of wat ackpiling RoM and adimentation and siltation	n be avoided in the of a water monitor of an Integrate of a storm water red incidents according preparedness product material siltation of waterco	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed pr ss plan. through or in close pr urses if not managed	Management Plan rocedure.	
Post-Mitigation Mitigation Measures:	Contamination of w (1) Development at (2) Development at (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im Sedimentation an Direct Impact: Sto	ater resources cand implementation and implementation dimplementation ecording all related plement an emerged siltation of water conditions and statementation and st	n be avoided in the of a water monitor of an Integrate of a storm water red incidents according product material siltation of watercounts of dirt roads	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed press plan. through or in close press	Management Plan rocedure.	
Post-Mitigation Mitigation Measures: Impact:	Contamination of w (1) Development an (2) Development an (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im Sedimentation an Direct Impact: Stollines may cause sedimentation and	ater resources cand implementation and implementation dimplementation ecording all related plement an emerged siltation of water continuous and some storm water runsiltation of nearby	n be avoided in the of a water monitor of an Integrate of a storm water red incidents accordancy preparedness product material siltation of watercourses watercourses.	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed pr ss plan. through or in close pr urses if not managed and un-vegetated	Management Plan rocedure. roximity to drainage properly. areas may cause	
Post-Mitigation Mitigation Measures: Impact:	Contamination of w (1) Development an (2) Development an (1) Development an (1) Development an (3) Development an (4) Reporting and r (5) Develop and im Sedimentation an Direct Impact: Stollines may cause selimentation and Duration	ater resources cand implementation and implementation dimplementation ecording all related plement an emerged siltation of water conditions and some storm water runsiltation of nearby Extent	n be avoided in the of a water monitor of an Integrate of a storm water red incidents according product material siltation of watercourses watercourses. Magnitude	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed pross plan. through or in close program. through or in close program. and un-vegetated Probability	Management Plan rocedure. roximity to drainage properly. areas may cause Significance	
Post-Mitigation Mitigation Measures: Impact:	Contamination of w (1) Development an (2) Development an (IWWMP). (3)Development an (4) Reporting and r (5) Develop and im Sedimentation an Direct Impact: Stollines may cause sedimentation and	ater resources cand implementation and implementation dimplementation ecording all related plement an emerged siltation of water continuous and some storm water runsiltation of nearby	n be avoided in the of a water monitor of an Integrate of a storm water red incidents accordancy preparedness product material siltation of watercourses watercourses.	3 ne following ways: oring program. ed Water and Waste management plan. ling to a developed pr ss plan. through or in close pr urses if not managed and un-vegetated	Management Plan rocedure. roximity to drainage properly. areas may cause	



Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:
	1) Development and implementation of water quality monitoring plan.
	(2) Reporting and recording incidents.

Activity:	22. Residue stockp	iles			
Impact:	Alteration of drainage patterns				
	Indirect Impact:	Indirect Impact: Alteration of the drainage patterns may lead to the degradation of			
	downstream or sur	rounding Wetland	s which in its turn	may affect the aqua	tic micro and macro
	ecology.				
	Direct Impact: S	ite clearing and	topsoil stripping t	hrough drainage line	es may lead to the
	siltation of streams	as well as lead t	o erosion along tl	he river banks that w	ill affect the surface
	water quality negat	ively.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	3	8	5	80
Post-Mitigation	4	1	6	4	44
Mitigation Measures:	The effects on sur	face water quality	resulting from the	ne alteration in draina	ge patterns can be
	remedied in the fol	lowing ways:			
	(1) Develop a wate	r monitoring mana	igement plan.		
	(2) Record and rep	ort all incidents re	lated to affecting v	water quality.	
	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to				measures related to
	reinstatement of drainage lines.				
Impact:	Contamination of	water resource			
	Direct Impact: Thr	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants			
	are used such as high levels of nitrates. Improper management of potential pollutants may lead				pollutants may lead
	to the degradation	of water quality	(both surface and	d sub-surface). Pollut	ed water resources
	may affect the aqua	atic environment i	n a detrimental ma	anner.	
	Indirect Impact: S	ub-surface mater	al and ore expos	ed to weathering ma	y release pollutants
	to the water resour	ces.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	he following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	2) Development and implementation of an Integrated Water and Waste Management Plan				
	(2) Bovolopinoni e	ina impiomortadio	in or an integrate	ou water and waste	Management Plan

Impact:	(3)Development and implementation of a storm water management plan. (4) Reporting and recording all related incidents according to a developed procedure. (5) Develop and implement an emergency preparedness plan. Sedimentation and siltation of watercourses Direct Impact: Stockpiling RoM and product material through or in close proximity to drainage				
	lines may cause sedimentation and siltation of watercourses if not managed properly. Indirect Impact: Storm water runoff of dirt roads and un-vegetated areas may cause sedimentation and siltation of nearby watercourses.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance			
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:				
	1) Development an	Development and implementation of water quality monitoring plan.			
	(2) Reporting and r	ecording incident	S.		

Activity:	23. Screening Ope	rations			
Impact:	Hydrocarbon Contamination				
	Direct Impact: Hy	drocarbon spills o	can occur where	heavy machinery suc	ch as the screening
	plant and hauling v	ehicles are parke	ed because they	contain large volume	s of lubricating oils,
	hydraulic oils, and	diesel to run. Th	nis poses a risk o	of hydrocarbon spills	if equipment is not
	maintained. Deper	nding on the size	of the spill the	level of contaminat	ion may vary from
	insignificant to sign	ificant and may a	ffect the surround	ling water quality (bo	th surface and sub-
	surface) as well as	surface) as well as the soil quality.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	8	5	65
Post-Mitigation	4	1	2	3	21
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be control	lled in the following
	ways:	ways:			
	(1) Develop and implement a Hazardous substances management plan specifically addressing			ecifically addressing	
	handling, storage, a	handling, storage, and transport of hazardous substances.			
	(2) Develop and ir	nplement an eme	ergency response	procedure addressing	ng the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing reme	ediation procedure	es.	
	(3) Development ar	nd implementation	of an incident rep	oorting procedure.	
Impact:	Contamination of	water resource			

	Direct Impact: V	Vater seeping f	rom stockpiles r	ooses a risk of le	ading to elevated
	-	concentrations of heavy metals and other elements in the groundwater environment, and can			
		potentially be acidic. When this water reaches surface water bodies or the groundwater it can			
	negatively affect the				9
			anditions of the w	ater resources may r	negatively affect the
	aquatic ecology.			,	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	8	5	75
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Contamination of w	rater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).	(IWWMP).			
	(3)Development an	(3)Development and implementation of a storm water management plan.			
	(4) Reporting and recording all related incidents according to a developed procedure.				
	(5) Develop and implement an emergency preparedness plan.				
Impact:	Sedimentation an	d siltation of wat	ercourses		
	Direct Impact: Sto	ockpiling screened	d material through	n or in close proximit	ty to drainage lines
	may cause sedime	ntation and siltatio	n of watercourses	if not managed prop	erly.
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause
	sedimentation and	siltation of nearby	watercourses.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the followin	g ways:	
	1) Development an	d implementation	of water quality m	onitoring plan.	

Activity:	24. Discard disposal (backfilling of mining area)
Impact:	Hydrocarbon Contamination
	Direct Impact: During backfilling activities equipment and plant are used. This poses a risk of
	hydrocarbon spills if equipment is not maintained. Depending on the size of the spill the level of
	contamination may vary from insignificant to significant and may affect the surrounding water
	quality (both surface and sub-surface) as well as the soil quality.
	Indirect Impact: The degradation of water quality and soil quality poses a risk of negatively

(2) Reporting and recording incidents.



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	affecting the condit	ions for micro and	I macro organisms	s to thrive.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	2	1	6	3	27		
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamin	ation can be <i>contro</i>	<i>lled</i> in the following		
	ways:						
	(1) Develop and im	nplement a Hazaro	dous substances r	management plan spe	ecifically addressing		
	handling, storage,	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	mplement an eme	ergency response	procedure addressir	ng the procedure in		
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or		
	accidents as well a	s addressing rem	ediation procedure	es.			
	(3) Development a	nd implementatior	of an incident rep	porting procedure.			
Impact:	Contamination of	water resource					
	Direct Impact: The	roughout the oper	ational phase of the	ne mining operations,	potential pollutants		
	are used such as h	igh levels of nitra	tes. Improper mar	agement of potential	pollutants may lead		
	to the degradation	of water quality	(both surface and	l sub-surface). Pollut	ed water resources		
	may affect the aqua	atic environment i	n a detrimental ma	anner.			
	-		ial and ore expos	ed to weathering ma	y release pollutants		
	to the water resour						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Contamination of w			•			
	(1) Development a	•		• •			
		and implementation	on of an Integrate	ed Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	•		-			
	. ,	•		ding to a developed po	rocedure.		
	(5) Develop and im			ss plan.			
Impact:	Sedimentation an				P		
	-	· ·	•	e proximity to drainag	ge lines may cause		
	sedimentation and				orogo manu sama		
	-			s and un-vegetated	areas may cause		
Cignificance wating	sedimentation and	·		Drobokility	Cianificance		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		



Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the followin	g ways:	
	1) Development an	d implementation	of water quality m	onitoring plan.	
	(2) Reporting and r	ecording incidents	S.		

Activity:	25. Waste generati	on, storage and d	isposal		
Impact:	Contamination of	water resource			
	Direct Impact: Th	e storage of large	e amounts of was	te over an extended	time in a area not
	lined or bunded pos	ses a risk of formi	ng potentially haza	ardous leachates.	
	Indirect Impact: The hazardous leachate from the waste storage facilities poses a risk of				
	contaminating both	surface and sub-	surface water reso	ources. This may lead	d to the degradation
	of conditions for the	e aquatic ecology	to thrive.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	8	5	65
Post-Mitigation	4	1	4	3	37
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water r	management plan.	
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed pr	ocedure.
	(5) Develop and im	plement an emerç	gency preparednes	ss plan.	
Impact:	Illegal dumping				
	Direct Impact: D	umping of gene	rated water in a	areas other than is	approved by the
	authorisation or EN	/IP poses a high r	isk of polluting nu	merous sources i.e.	Water and soil. The
	dumping of genera	l waste poses a c	hoking risk to graz	zing animals. Hazardo	ous Leachates from
	illegal dumps also	poses a risk to the	health of surroun	ding communities.	
	Indirect Impact:	The hazardous le	achate from the	waste storage faciliti	es poses a risk of
	contaminating both	surface and sub-	-surface water as	well as soil resource	s. This may lead to
	the degradation of	conditions for the	aquatic ecology to	thrive.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
		0	8	E	
Pre-Mitigation	4	2	0	5	70
Pre-Mitigation Post-Mitigation	4	1	6	3	70



(1) Develop and implement as waste management	nt plan with the focus on reuse, reduce,
recycle, or avoid.	
(2) Development and maintenance of a waste dispo-	sal record keeping system.

Activity:	26. Chemical Toile	ts			
Impact:	Contamination of	water resource			
	Direct Impact: Improper management of effluent from chemical toilets poses a high risk to contaminating water resources. Indirect Impact: 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.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	6	5	40
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Contamination of w	ater resources ca	in be avoided in th	ne following ways:	
	(1) Development a	nd implementation	n of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water r	nanagement plan.	
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed p	ocedure.
	(5) Develop and im	plement an emerg	gency preparedne	ss plan.	

Activity:	27. River crossings	}			
Impact:	Hydrocarbon Contamination				
	Direct Impact: Throughout the construction and operational phase construction equipment are				
	used. This poses a	a risk of hydroca	rbon spills if equip	oment are not maintai	ined. Depending on
	the size of the spill	the level of conta	amination may var	y from insignificant to	significant and may
	affect the surround	ing water quality	(both surface and	sub-surface) as well a	s the soil quality.
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	2	6	5	55
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Potential impact re	sulting from hydi	rocarbon contamii	nation can be <i>control</i>	Iled in the following
	ways:				
	(1) Develop and im	plement a Hazar	dous substances	management plan spe	ecifically addressing
	handling, storage, a	and transport of h	azardous substar	ices.	

	(2) Develop and ir	mplement an eme	ergency response	procedure addressing	ng the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing remo	ediation procedure	es.	
	(3) Development a	nd implementatior	of an incident rep	porting procedure.	
Impact:	Sedimentation an	d siltation of wat	ercourses		
	Direct Impact: Exc	cavating, stockpilir	ng and transport o	f material through or i	in close proximity to
	drainage lines may	cause sedimenta	tion and siltation o	of watercourses if not	managed properly.
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause
	sedimentation and	siltation of nearby	watercourses.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	4	44
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the followin	g ways:	
	1) Development an	d implementation	of water quality m	onitoring plan.	
	(2) Reporting and r	ecording incidents	S.		
Impact:	Water level reduc	tion and contami	nation		
	Direct Impact: Imp	proper installation	of river crossing i	nfrastructures poses	a risk in water level
	reduction and conta	amination of down	stream water use	rs i.e. through blockin	g of the natural flow
					•
	of streams/rivers.				
		he reduction of w	rater levels of rive	rs/watercourses pose	
				rs/watercourses pose	
Significance rating:	Indirect Impact: T			rs/watercourses pose	
Significance rating: Pre-Mitigation	Indirect Impact: T both surface and si	ub-surface water r	esources.		es a risk of affecting
	Indirect Impact: T both surface and so Duration	ub-surface water r	esources. Magnitude	Probability	es a risk of affecting Significance
Pre-Mitigation	Indirect Impact: Tooth surface and surface	ub-surface water r Extent 2 1	Magnitude 6 2	Probability 5	Significance 60 21
Pre-Mitigation Post-Mitigation	Indirect Impact: Tooth surface and surface	ub-surface water r Extent 2 1	Magnitude 6 2	Probability 5	Significance 60 21
Pre-Mitigation Post-Mitigation	Indirect Impact: Tooth surface and some Duration 4 4 Water level reduction	Extent 2 1 on and contamina	Magnitude 6 2 tion affecting the s	Probability 5 3 surface water quality of	Significance 60 21
Pre-Mitigation Post-Mitigation	Indirect Impact: Tooth surface and some Duration 4 4 Water level reduction following ways:	ub-surface water r Extent 2 1 on and contamina nd implementation	Magnitude 6 2 tion affecting the second of water quality necessions.	Probability 5 3 surface water quality of	Significance 60 21
Pre-Mitigation Post-Mitigation	Indirect Impact: Tooth surface and some Duration 4 4 Water level reduction following ways: (1) Development and some Duration surface and surface and some Duration surface and	ub-surface water r Extent 2 1 on and contamina nd implementation f a storm water ma	Magnitude 6 2 tion affecting the samagement plan.	Probability 5 3 surface water quality of	Significance 60 21
Pre-Mitigation Post-Mitigation	Indirect Impact: To both surface and so Duration 4 Water level reduction following ways: (1) Development and (2) Development of the surface and so the surface and so the surface and su	Extent 2 1 on and contamina nd implementation f a storm water material	Magnitude 6 2 tion affecting the samagement plan. 6.	Probability 5 3 surface water quality of	Significance 60 21
Pre-Mitigation Post-Mitigation	Indirect Impact: Tooth surface and some pouration 4 Water level reduction following ways: (1) Development and (2) Development of (3) Reporting and respectively.	b-surface water r Extent 2 1 on and contaminated implementation of a storm water material ecording incidents ess of water conse	Magnitude 6 2 tion affecting the samagement plan. 6.	Probability 5 3 surface water quality of	Significance 60 21
Pre-Mitigation Post-Mitigation Mitigation Measures:	Indirect Impact: Tooth surface and some Duration 4 Water level reduction following ways: (1) Development of (3) Reporting and row (4) Create awareness Alteration of drain	Extent 2 1 on and contamina nd implementation f a storm water material ecording incidents ess of water consentage patterns	Magnitude 6 2 tion affecting the samagement plan. s. ervation.	Probability 5 3 surface water quality of	Significance 60 21 can be controlled in
Pre-Mitigation Post-Mitigation Mitigation Measures:	Indirect Impact: Tooth surface and some Duration 4 Water level reduction following ways: (1) Development of (3) Reporting and row (4) Create awareness Alteration of drain Indirect Impact:	b-surface water r Extent 2 1 on and contamina nd implementation f a storm water material incidents ess of water consentation had patterns Alteration of the	Magnitude 6 2 tion affecting the same of water quality management plan. s. ervation.	Probability 5 3 surface water quality of the control of the contro	Significance 60 21 can be controlled in
Pre-Mitigation Post-Mitigation Mitigation Measures:	Indirect Impact: Tooth surface and some Duration 4 Water level reduction following ways: (1) Development of (3) Reporting and row (4) Create awareness Alteration of drain Indirect Impact:	b-surface water r Extent 2 1 on and contamina nd implementation f a storm water material incidents ess of water consentation had patterns Alteration of the	Magnitude 6 2 tion affecting the same of water quality management plan. s. ervation.	Probability 5 3 surface water quality of the continuity of the con	Significance 60 21 can be controlled in

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	siltation of streams	as well as lead t	o erosion along th	ne river banks that wi	Il affect the surface
	water quality negat	ively.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	8	5	75
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	The effects on surface water quality resulting from the alteration in drainage patterns can be				
	remedied in the fol	lowing ways:			
	(1) Develop a wate	r monitoring mana	agement plan.		
	(2) Record and rep	ort all incidents re	lated to affecting v	water quality.	
	(3) Develop a reha	abilitation plan spe	ecifically addressi	ng the rehabilitation r	neasures related to
	reinstatement of dra	ainage lines.			
Impact:	Contamination of	water resource			
	Direct Impact: Sto	rm water run-off f	rom river crossing	structures containing	pollutants poses a
	risk in contaminatin	ng the surrounding	water resources.		
	Indirect Impact: F	Pollutants poses a	a risk in altering	the conditions of the	aquatic ecology to
	thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in tl	ne following ways:	
	(1) Development ar	nd implementation	n of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water r	management plan.	
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed pr	ocedure.
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.	

Activity:	28. Water supply (p	otable & process			
Impact:	Water level reduction and contamination				
	Direct Impact: Wa	ter wastage and	over exploitation	of water resources po	oses a risk in water
	level reduction.				
	Indirect Impact: T	ne reduction of wa	ater levels of rivers	s/watercourses/under	ground water tables
	poses a risk of affe	cting both surface	and sub-surface	water resources.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60



Post-Mitigation	4	1	2	3	21	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the s	surface water quality o	can be controlled in	
	following ways:					
	(1) Development a	nd implementation	of water quality n	nonitoring plan.		
	(2) Development of	a storm water ma	anagement plan.			
	(3) Reporting and r	3) Reporting and recording incidents.				
	(4) Create awareness of water conservation.					
Impact:	Contamination of	water resource				
	Direct Impact: Lea	aks and breaks of	water supply infr	astructure poses a ris	sk of contaminating	
	water resources.					
	Indirect Impact: F	Pollutants poses a	a risk in altering t	he conditions of the	aquatic ecology to	
	thrive.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	2	2	14	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:		
	(1) Development a	nd implementation	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water r	management plan.		
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed pr	ocedure.	
	(5) Develop and im	plement an emerç	gency preparednes	ss plan.		

Activity:	29. Storage of fuel	and lubricants in	temporary		
Impact:	Hydrocarbon Con	tamination			
	Direct Impact: The	e construction of	improper storage	e facilities poses a risl	k of the surrounding
	environment to b	e exposes to	continuous leal	king of hydrocarbons	s leading possibly
	contaminating surf	ace and sub-sur	face water source	ces as well as the so	oils surrounding the
	facility.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	2	8	5	60
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Potential impact re	sulting from hyd	rocarbon contami	ination can be <i>contro</i>	<i>lled</i> in the following
	ways:				
	(1) Develop and im	plement a Hazar	dous substances	management plan sp	ecifically addressing

	handling, storage, a	and transport of h	azardous substan	ces.	
	(2) Develop and ir	mplement an eme	ergency response	procedure addressing	ng the procedure in
	case of a chemical	spill. This proceed	dure should ensu	re the fastest possible	reaction to spills or
	accidents as well a	s addressing rem	ediation procedure	es.	
	(3) Development ar	nd implementatior	n of an incident re	porting procedure.	
Impact:	Contamination of water resource				
	Direct Impact: T	he use of impro	per storage fac	ilities poses a risk o	of the surrounding
	environment to b	e exposes to	continuous leak	ing of hydrocarbons	s leading possibly
	contaminating surf	ace and sub-sur	face water source	es as well as the so	oils surrounding the
	facility.	contaminating surface and sub-surface water sources as well as the soils surrounding the			
	iacility.				
Significance rating:	Duration Duration	Extent	Magnitude	Probability	Significance
Significance rating: Pre-Mitigation		Extent 1	Magnitude 8	Probability 5	Significance 55
	Duration	Extent 1			_
Pre-Mitigation	Duration 2	1	8 6	5 3	55
Pre-Mitigation Post-Mitigation	Duration 2	1 1 vater resources ca	8 6 an be avoided in t	5 3 he following ways:	55
Pre-Mitigation Post-Mitigation	Duration 2 1 Contamination of w (1) Development an	1 1 rater resources cand implementation	8 6 In be avoided in to of a water monitor	5 3 he following ways:	55 24
Pre-Mitigation Post-Mitigation	Duration 2 1 Contamination of w (1) Development an	1 1 rater resources cand implementation	8 6 In be avoided in to of a water monitor	5 3 he following ways: oring program.	55 24
Pre-Mitigation Post-Mitigation	Duration 2 1 Contamination of w (1) Development ar (2) Development a	1 1 vater resources cand implementation implementation	8 6 In be avoided in to of a water monitor of an Integrate	5 3 he following ways: oring program. ed Water and Waste	55 24
Pre-Mitigation Post-Mitigation	Duration 2 1 Contamination of w (1) Development ar (2) Development ar (IWWMP). (3)Development an	1 1 vater resources cand implementation implementation dimplementation	8 6 In be avoided in to of a water monitor of an Integrate of a storm water	5 3 he following ways: oring program. ed Water and Waste	55 24 Management Plan

Activity:	30. Vehicular activi	30. Vehicular activity on haul roads; and operation of mining equipment			
Impact:	Hydrocarbon Con	Hydrocarbon Contamination			
	Direct Impact: The	e use of vehicles	on haul roads th	roughout the operation	onal phase poses a
	risk of hydrocarbon	spills if equipmer	nt are not maintair	ned. Depending on the	size of the spill the
	level of contaminat	ion may vary fron	n insignificant to s	ignificant and may aff	ect the surrounding
	water quality (both surface and sub-surface) as well as the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	8	5	65
Post-Mitigation	1	1	4	4	24
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamir	nation can be control	lled in the following
	ways:				
	(1) Develop and implement a Hazardous substances management plan specifically addressing				
	handling, storage, and transport of hazardous substances.				
	(2) Develop and ir	nplement an eme	ergency response	procedure addressing	ng the procedure in

	case of a chemical	spill. This proc	edure should ensi	ure the fastest possi	ble reaction to spills or
	accidents as well a	accidents as well as addressing remediation procedures.			
	(3) Development a	nd implementation	on of an incident r	eporting procedure.	
Impact:	Sedimentation an	d siltation of w	atercourses		
	Direct Impact: Co	nstructing acce	ss roads through	drainage lines may	cause sedimentation
	and siltation of wat	and siltation of watercourses if not managed properly			
	Indirect Impact: S	Indirect Impact: Storm water runoff of dirt roads may cause sedimentation and siltation of			
	nearby watercourse	nearby watercourses.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	1	1	4	4	24
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:				
	1) Development and implementation of water quality monitoring plan.				
	(2) Reporting and r	ecording incider	nts.		

Destruction of upstream tributaries and reduction in water in the catchment			
adation of			
and macro			
vailable to			
adation of			
ance			
70			
27			
taries and			
related to			
oile areas,			
ding water			
t			



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	courses and drainage lines.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	4	4	27
Mitigation Measures:	Surface water qual	ity can be <i>contro</i> l	lled in the followin	g ways:	
	1) Development an	d implementation	of water quality m	onitoring plan.	
	(2) Reporting and r	ecording incidents	S.		
Impact:	Water level reduct	tion and contami	ination		
	Direct Impact: Imp	proper manageme	ent of water usage	and installation of in	nproper storm water
	features and infrast	tructure poses a r	isk of reducing the	water levels for dow	nstream users.
	Indirect Impact: T	he reduction of wa	ater levels of rivers	s/watercourses/under	ground water tables
	poses a risk of affe	cting both surface	and sub-surface	water resources.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	2	3	21
Mitigation Measures:	Water level reduction	Water level reduction and contamination affecting the surface water quality can be controlled in			can be controlled in
	following ways:				
	(1) Development and implementation of water quality monitoring plan.				
	(2) Development of a storm water management plan.				
	(3) Reporting and recording incidents.				
	(4) Create awareness of water conservation.				
Impact:	Alteration of drain	age patterns			
	Indirect Impact: Alteration of the drainage patterns may lead to the degradation of				the degradation of
	downstream or sur	rounding Wetland	s which in its turn	may affect the aqua	tic micro and macro
	ecology.				
	Direct Impact: Si	te clearing and t	opsoil stripping t	hrough drainage line	es may lead to the
	siltation of streams	as well as lead t	o erosion along the	he river banks that w	ill affect the surface
	water quality negat	ively.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	8	5	75
Post-Mitigation	4	1	4	4	36
Mitigation Measures:	The effects on sur	face water quality	resulting from th	ne alteration in draina	ige patterns can be
	<i>remedied</i> in the fol	lowing ways:			
	(1) Develop a water monitoring management plan.				
	(2) Record and rep	ort all incidents re	lated to affecting v	water quality.	

	(3) Develop a reha		ecifically address	ing the rehabilitation r	measures related to
Impact:	Contamination of	Contamination of water resource			
	Direct Impact: The	e poor manageme	ent of onsite wate	r i.e. Storm water, prod	cess water, effluent,
	and potable water	etc. may lead to th	ne contamination	of water resources.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	8	5	75
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in	the following ways:	
	(1) Development and implementation of a water monitoring program.				
	(2) Development and implementation of an Integrated Water and Waste Management Plan			Management Plan	
	(IWWMP).				
	(3)Development and implementation of a storm water management plan.				
	(4) Reporting and recording all related incidents according to a developed procedure.				
	(5) Develop and im	plement an emerç	gency preparedne	ess plan.	

Activity:	33. Rehabilitation o	33. Rehabilitation of mining areas			
Impact:	Sedimentation an	Sedimentation and siltation of watercourses			
	Direct Impact: Ru	noff from expose	ed un-vegetated a	reas poses a risk in o	contaminating nearby
	streams, rivers, and drainage lines.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance			
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	4	4	27
Mitigation Measures:	Surface water qual	Surface water quality can be <i>controlled</i> in the following ways:			
	1) Development and implementation of water quality monitoring plan.				
	(2) Reporting and r	(2) Reporting and recording incidents.			

Aspect:		Ground Water Quality
Acti	vity:	18.Topsoil and subsoil stripping & stockpiling for mining operation area
Imp	oact:	Hydrocarbon Contamination
		Direct Impact: Throughout the operational phase construction equipment are used. This poses
		a risk of hydrocarbon spills if equipment are not maintained. Depending on the size of the spill
		the level of contamination may vary from insignificant to significant and may affect the
		surrounding water quality (both surface and sub-surface) as well as the soil quality.



Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	2	6	2	24	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamir	nation can be <i>contro</i>	<i>lled</i> in the following	
	ways:					
	(1) Develop and im	plement a Hazard	dous substances	management plan sp	ecifically addressing	
	handling, storage, a	and transport of h	azardous substar	ices.		
	(2) Develop and in	nplement an eme	ergency response	procedure addressing	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensu	re the fastest possible	e reaction to spills or	
	accidents as well a	s addressing rem	ediation procedur	es.		
	(3) Development ar	nd implementatior	of an incident re	porting procedure.		
Impact:	Water level reduct	Water level reduction and contamination				
	Direct Impact: The	Direct Impact: The reduction in water levels as well as contamination of the water resource				
	that may be cause	ed by alternating	the topography	during site clearing a	and topsoil stripping	
	poses a risk to affecting the surface and sub-surface water quality as well as the downstream					
	users					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the	surface water quality	can be controlled in	
	following ways:					
	(1) Development and implementation of water quality monitoring plan.					
	(2) Development of a storm water management plan.					
	(3) Reporting and re	ecording incidents	S.			
	(4) Create awarene	ess of water conse	ervation.			

Activity:	19.Opencast mining	19.Opencast mining excavations			
Impact:	Hydrocarbon Con	Hydrocarbon Contamination			
	Direct Impact: Thr	Direct Impact: Throughout the operational phase construction equipment are used. This poses			
	a risk of hydrocarb	a risk of hydrocarbon spills if equipment is not maintained. Depending on the size of the spill			
	the level of contamination may vary from insignificant to significant and may affect the				
	surrounding water quality (both surface and sub-surface) as well as the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	2	6	3	36

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Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be control	led in the following
	ways:				
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing			
	handling, storage,	and transport of ha	azardous substan	ces.	
	(2) Develop and ir	mplement an eme	ergency response	procedure addressin	g the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing reme	ediation procedure	es.	
	(3) Development a	nd implementation	of an incident rep	orting procedure.	
Impact:	Contamination of	water resources			
	Direct Impact: The	oughout the oper	ational phase of t	ne mining operations,	potential pollutants
	are used such as h	igh levels of nitrat	es. Improper man	agement of potential	pollutants may lead
	to the degradation of water quality (both surface and sub-surface). Polluted water resources				
	may affect the aquatic environment in a detrimental manner.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	ne following ways:	
	(1) Development a	nd implementation	of a water monito	oring program.	
	(2) Development and implementation of an Integrated Water and Waste Management Plan				
	(IWWMP).				
	(3)Development and implementation of a storm water management plan.				
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed pr	ocedure.
	(C) Davidan and in	5) Develop and implement an emergency preparedness plan.			

Activity:	20.Drilling & Blastin	ng			
Impact:	Hydrocarbon Con	tamination			
	Direct Impact: The	e use of drill Rigg	s poses a high ris	k of hydrocarbon spills	s. Depending on the
	size of the spill the	e level of contam	nination may vary	from insignificant to	significant and may
	affect the surrounding water quality (both surface and sub-surface) as well as the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	6	3	33
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be controlled in the following			Iled in the following	
	ways:				
	(1) Develop and im	plement a Hazar	dous substances	management plan spo	ecifically addressing

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handling, storage, and transport of hazardous substances.
(2) Davalon and implement an amergancy response procedure addressing

- (2) Develop and implement an emergency response procedure addressing the procedure in case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or accidents as well as addressing remediation procedures.
- (3) Development and implementation of an incident reporting procedure.

Impact: Contamination of water resources

Direct Impact: Improper management of blasting activities poses the risk of contaminating water resources with pollutants such as high content of Nitrates. The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	3	8	5	75
Post-Mitigation	4	1	6	3	33

Mitigation Measures:

Contamination of water resources can be **avoided** in the following ways:

- (1) Development and implementation of a water monitoring program.
- (2) Development and implementation of an Integrated Water and Waste Management Plan (IWWMP).
- (3)Development and implementation of a storm water management plan.
- (4) Reporting and recording all related incidents according to a developed procedure.
- (5) Develop and implement an emergency preparedness plan.

Activity:	22. Residue stockpiles							
Impact:	Contamination of water resources							
	Direct Impact: The	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants						
	are used such as h	igh levels of nitr	ates. Improper ma	nagement of potentia	l pollutants may lead			
	to the degradation	of water quality	/ (both surface ar	nd sub-surface). Pollu	ited water resources			
	may affect the aqua	atic environment	in a detrimental n	nanner.				
	Indirect Impact: Sub-surface material and ore exposed to weathering may release pollutants							
	to the water resources.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:							
	(1) Development and implementation of a water monitoring program.							
	(2) Development and implementation of an Integrated Water and Waste Management Plan							
	(IWWMP).							

	(3)Development an	(3)Development and implementation of a storm water management plan.					
	(4) Reporting and recording all related incidents according to a developed procedure.						
	(5) Develop and im	(5) Develop and implement an emergency preparedness plan.					
Impact:	Hazardous Leachate						
	Direct Impact: Po	tential pollutant in	the residue mate	erial resulting from m	ining operation may		
	lead to the formati	lead to the formation of leachate. The leachate may contain toxins that are hazardous to the					
	aquatic ecology and water resources.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	5	2	8	5	75		
Post-Mitigation	4 1 6 3 33						
Mitigation Measures:	Formed hazardous leachate can be <i>controlled</i> in the following ways:						
	(1) Design and implement a Integrated Waste Water Management Plan (IWWMP).						
	(2) Develop and im	plement a water o	quality manageme	nt plan.			
	(3) Report and record any incidents related to hazardous leachates.						

Activity:	23. Screening Operations						
Impact:	Hydrocarbon Contamination						
	Direct Impact: Hy	Direct Impact: Hydrocarbon spills can occur where heavy machinery such as the screening					
	plant and hauling v	plant and hauling vehicles are parked because they contain large volumes of lubricating oils,					
	hydraulic oils, and	diesel to run. Th	nis poses a risk o	of hydrocarbon spills	if equipment is not		
	maintained. Deper	nding on the size	e of the spill the	level of contaminat	ion may vary from		
	insignificant to sign	ificant and may a	Iffect the surround	ding water quality (bo	th surface and sub-		
	surface) as well as	the soil quality.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	8	5	65		
Post-Mitigation	4	1	2	3	21		
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be control	lled in the following		
	ways:						
	(1) Develop and im	plement a Hazaro	dous substances i	management plan spe	ecifically addressing		
	handling, storage, a	and transport of ha	azardous substan	ces.			
	(2) Develop and implement an emergency response procedure addressing the procedure in						
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or						
	accidents as well as addressing remediation procedures.						
	(3) Development and implementation of an incident reporting procedure.						
Impact:	Contamination of	water resources					

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Direct Impact: 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. When this water reaches surface water bodies or the groundwater it can
negatively affect the water quality.

Indirect Impact: Alteration to the conditions of the water resources may negatively affect the aquatic ecology.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	3	8	5	75		
Post-Mitigation	4	1	6	2	22		
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:						
	(1) Development and implementation of a water monitoring program.						
	(2) Development and implementation of an Integrated Water and Waste Management Plan						
	(IWWMP).						

- (3)Development and implementation of a storm water management plan.
- (4) Reporting and recording all related incidents according to a developed procedure.
- (5) Develop and implement an emergency preparedness plan.

Activity:	24. Discard disposal (backfilling of mining area)					
Impact:	Hydrocarbon Contamination					
	Direct Impact: During backfilling activities equipment and plant are used. This poses a risk of					
	hydrocarbon spills if equipment is not maintained. Depending on the size of the spill the level of					
	contamination may	vary from insign	ificant to significa	nt and may affect the	e surrounding water	
	quality (both surfac	e and sub-surface	e) as well as the so	oil quality.		
	Indirect Impact: The degradation of water quality and soil quality poses a risk of negatively					
	affecting the conditions for micro and macro organisms to thrive.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Pre-Mitigation Post-Mitigation	3	1	6 4	5 2	60 16	
	3	1	4		16	
Post-Mitigation	3	1	4	2	16	
Post-Mitigation	3 Potential impact reways:	1 sulting from hydr	4 ocarbon contamin	2	16 Iled in the following	
Post-Mitigation	3 Potential impact reways:	1 sulting from hydroplement a Hazaro	4 ocarbon contamin	ation can be <i>control</i>	16 Iled in the following	
Post-Mitigation	3 Potential impact reways: (1) Develop and imhandling, storage, a	1 sulting from hydropelement a Hazard	4 ocarbon contamin dous substances r azardous substanc	ation can be <i>control</i>	16 Iled in the following ecifically addressing	
Post-Mitigation	3 Potential impact re ways: (1) Develop and imhandling, storage, a (2) Develop and ir	1 sulting from hydraplement a Hazard and transport of hamplement an eme	4 ocarbon contamin dous substances r azardous substance ergency response	ation can be <i>control</i> management plan speces.	16 Iled in the following ecifically addressing ag the procedure in	

	(3) Development and implementation of an incident reporting procedure.						
Impact:	Contamination of water resources						
	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants						
	are used such as h	igh levels of nitrat	tes. Improper man	agement of potential	pollutants may lead		
	to the degradation	of water quality	(both surface and	l sub-surface). Pollut	ed water resources		
	may affect the aqua	atic environment i	n a detrimental ma	anner.			
	Indirect Impact: S	sub-surface mater	ial and ore expos	ed to weathering mag	y release pollutants		
	to the water resources.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	4	2	18		
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	ne following ways:			
	(1) Development a	nd implementation	of a water monito	oring program.			
	(2) Development and implementation of an Integrated Water and Waste Management Plan						
	(IWWMP).						
	(3)Development and implementation of a storm water management plan.						
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed p	rocedure.		
	(5) Develop and im	plement an emerg	gency preparedne	ss plan.			

Activity:	25. Waste generation, storage and disposal						
Impact:	Contamination of water resources						
	Direct Impact: Th	Direct Impact: The storage of large amounts of waste over an extended time in a area not					
	lined or bunded pos	ses a risk of formi	ng potentially haza	ardous leachates.			
	Indirect Impact:	The hazardous le	achate from the	waste storage faciliti	es poses a risk of		
	contaminating both	surface and sub-	surface water res	ources. This may lead	to the degradation		
	of conditions for the aquatic ecology to thrive.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	8	5	65		
Post-Mitigation	4	1	4	2	18		
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	ne following ways:			
	(1) Development and implementation of a water monitoring program.						
	(2) Development and implementation of an Integrated Water and Waste Management Plan						
	(IWWMP).						
	(3)Development an	d implementation	of a storm water r	management plan.			
	(4) Reporting and r	ecordina all relate	d incidents accord	ling to a developed pr	rocedure		



	(5) Develop and implement an emergency preparedness plan.						
Impact:	Hazardous Leach	Hazardous Leachate					
	Direct Impact: Th	Direct Impact: The hazardous leachate from the waste storage facilities poses a risk of					
	contaminating both	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.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	Formed hazardous	leachate can be	controlled in the f	ollowing ways:			
	(1) Design and imp	(1) Design and implement a Integrated Waste Water Management Plan (IWWMP).					
	(2) Develop and im	plement a water o	luality manageme	nt plan.			
	(3) Report and reco	ord any incidents r	elated to hazardo	us leachates.			

Activity:	26. Chemical Toilets					
Impact:	Contamination of	Contamination of water resources				
	Direct Impact: Im	proper managem	ent of effluent fro	m chemical toilets p	oses a high risk to	
	contaminating wate	er resources.				
	Indirect Impact: O	ver an extended p	period of time the	exposure to contamir	nation will cause the	
	degradation of fau	na and flora habi	tats as well as a	ffect the surface and	l sub-surface water	
	quality.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	1	6	5	40	
Post-Mitigation	1	1	4	2	12	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:		
	(1) Development ar	nd implementation	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water r	management plan.		
	(4) Reporting and re	ecording all relate	d incidents accord	ling to a developed pr	ocedure.	
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.		

Activity:	27. River crossings
Impact:	Hydrocarbon Contamination
	Direct Impact: Throughout the construction and operational phase construction equipment are
	used. This poses a risk of hydrocarbon spills if equipment are not maintained. Depending on



	the size of the spill the level of contamination may vary from insignificant to significant and may									
	affect the surround	affect the surrounding water quality (both surface and sub-surface) as well as the soil quality.								
Significance rating:	Duration	Extent	Magnitude	Probability	Significance					
Pre-Mitigation	4	1	6	5	55					
Post-Mitigation	4	1	4	3	27					
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	led in the following					
	ways:									
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing								
	handling, storage,	and transport of h	azardous substand	ces.						
	(2) Develop and ir	nplement an eme	ergency response	procedure addressin	g the procedure in					
	case of a chemical	spill. This proced	dure should ensure	e the fastest possible	reaction to spills or					
	accidents as well a	s addressing remo	ediation procedure	es.						
	(3) Development a	nd implementation	of an incident rep	orting procedure.						
Impact:	Water level reduc	tion and contami	nation							
	Direct Impact: Imp	proper installation	of river crossing in	nfrastructures poses	a risk in water level					
	reduction and conta	amination of down	stream water user	rs i.e. through blocking	g of the natural flow					
	of streams/rivers.									
	-			rs/watercourses pose	s a risk of affecting					
	both surface and s	ub-surface water r	esources.							
Significance rating:	Duration	Extent	Magnitude	Probability	Duration Extent Magnitude Probability Significance					
			^	_						
Pre-Mitigation	4	2	6	5	60					
Post-Mitigation	4	1	2	3	60 21					
•	4	1	2	-	60					
Post-Mitigation	4 Water level reduction following ways:	1 on and contamina	2 tion affecting the s	3 surface water quality o	60					
Post-Mitigation	4 Water level reduction following ways: (1) Development and	1 on and contamina	2 tion affecting the s	3 surface water quality o	60					
Post-Mitigation	4 Water level reduction following ways: (1) Development and (2) Development of	1 on and contamina and implementation f a storm water ma	2 tion affecting the solution of water quality management plan.	3 surface water quality o	60					
Post-Mitigation	4 Water level reduction following ways: (1) Development and (2) Development of (3) Reporting and reduction for the following ways:	1 on and contaminal and implementation for a storm water made ecording incidents	2 tion affecting the solution affecting the s	3 surface water quality o	60					
Post-Mitigation Mitigation Measures:	4 Water level reduction following ways: (1) Development and (2) Development of (3) Reporting and reduction (4) Create awareness	1 on and contaminal and implementation for a storm water mater according incidents ass of water conse	2 tion affecting the solution of water quality nanagement plan. s. ervation.	3 surface water quality o	60					
Post-Mitigation	4 Water level reduction following ways: (1) Development and (2) Development of (3) Reporting and reduction (4) Create awareness Contamination of	1 on and contaminal and implementation for a storm water mater material according incidents ass of water consequences.	2 tion affecting the solution affecting the solution affecting the solution and solution affects after the solution affects and solution affects after the solution after the solution affects after the solution a	3 surface water quality on the control of the contr	60 21 can be controlled in					
Post-Mitigation Mitigation Measures:	4 Water level reduction following ways: (1) Development and (2) Development of (3) Reporting and rough (4) Create awarene Contamination of Direct Impact: Sto	1 on and contaminal and implementation for a storm water mater according incidents ass of water conservater resources form water run-off for and contamination and contaminati	tion affecting the same of water quality management plan. s. ervation.	3 surface water quality o	60 21 can be controlled in					
Post-Mitigation Mitigation Measures:	4 Water level reduction following ways: (1) Development of (2) Development of (3) Reporting and rough (4) Create awarene Contamination of Direct Impact: Storisk in contamination	1 on and contaminal and implementation for a storm water mater conservator resources water resources arm water run-off for the surrounding	tion affecting the same of water quality management plan. s. ervation. rom river crossing water resources.	3 surface water quality on nonitoring plan.	60 21 can be controlled in					
Post-Mitigation Mitigation Measures:	4 Water level reduction following ways: (1) Development of (2) Development of (3) Reporting and rough (4) Create awarene Contamination of Direct Impact: Storisk in contamination Indirect Impact: F	1 on and contaminal and implementation for a storm water mater conservator resources water resources arm water run-off for the surrounding	tion affecting the same of water quality management plan. s. ervation. rom river crossing water resources.	3 surface water quality on the control of the contr	60 21 can be controlled in					
Post-Mitigation Mitigation Measures: Impact:	Water level reduction following ways: (1) Development of (2) Development of (3) Reporting and rough (4) Create awarene Contamination of Direct Impact: Storisk in contamination Indirect Impact: Full following the following stories in the contamination of the con	1 on and contaminal on and implementation for a storm water made ecording incidents assort water resources water resources from water run-off for the surrounding Pollutants poses as	tion affecting the same of water quality management plan. s. ervation. rom river crossing water resources. a risk in altering t	3 surface water quality of nonitoring plan. structures containing the conditions of the	an be controlled in pollutants poses a aquatic ecology to					
Post-Mitigation Mitigation Measures:	4 Water level reduction following ways: (1) Development of (2) Development of (3) Reporting and rough (4) Create awarene Contamination of Direct Impact: Storisk in contamination Indirect Impact: F	1 on and contaminal and implementation for a storm water mater conservator resources water resources arm water run-off for the surrounding	tion affecting the same of water quality management plan. s. ervation. rom river crossing water resources.	3 surface water quality on nonitoring plan.	60 21 can be controlled in					



Post-Mitigation	4	1	4	3	27			
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:							
	(1) Development and implementation of a water monitoring program.							
	(2) Development and implementation of an Integrated Water and Waste Management Plan							
	(IWWMP).							
	(3)Development and implementation of a storm water management plan.							
	(4) Reporting and recording all related incidents according to a developed procedure.							
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.				

Activity:	28. Water supply (potable & process)					
Impact:	Water level reduction and contamination					
impuot.		Direct Impact: Water wastage and over exploitation of water resources poses a risk in water				
	level reduction.					
		ha raduation of w	ator lovolo of rivor	a/wataraayraaa/yadar	around water tables	
	-			s/watercourses/under	ground water tables	
0: :6: (:	poses a risk of affe		1		0: :6:	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	2	3	21	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the	surface water quality of	can be controlled in	
	following ways:					
	(1) Development ar	nd implementatior	of water quality r	monitoring plan.		
	(2) Development of	a storm water ma	anagement plan.			
	(3) Reporting and r	ecording incidents	S.			
	(4) Create awarene	ess of water conse	ervation.			
Impact:	Contamination of	water resources				
	Direct Impact: Lea	aks and breaks o	f water supply infi	rastructure poses a ri	sk of contaminating	
	water resources.					
	Indirect Impact: F	Pollutants poses	a risk in altering	the conditions of the	aquatic ecology to	
	thrive.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	4	48	
Post-Mitigation	4	1	4	1	9	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	he following ways:		
	(1) Development ar	nd implementatior	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	



(IWWMP).	
(3)Development and implementation of a storm water management plan.	
(4) Reporting and recording all related incidents according to a developed procedure.	l
(5) Develop and implement an emergency preparedness plan.	
(; (;	3)Development and implementation of a storm water management plan. 4) Reporting and recording all related incidents according to a developed procedure.

Activity:	29. Storage of fuel	and lubricants in t	emporary facilities	3			
Impact:	Hydrocarbon Con	tamination					
	Direct Impact: The	Direct Impact: The construction of improper storage facilities poses a risk of the surrounding					
	environment to b	environment to be exposes to continuous leaking of hydrocarbons leading possibly					
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	ils surrounding the		
	facility.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	1	8	5	55		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be control	lled in the following		
	ways:						
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing		
	handling, storage, a	and transport of ha	azardous substan	ces.			
	(2) Develop and ir	nplement an eme	ergency response	procedure addressing	ng the procedure in		
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or		
	accidents as well a	s addressing reme	ediation procedure	es.			
	(3) Development ar	nd implementation	of an incident rep	porting procedure.			
Impact:	Contamination of	water resources					
	Direct Impact: T	ne use of impro	per storage faci	lities poses a risk	of the surrounding		
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	s leading possibly		
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	oils surrounding the		
	facility.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	1	8	5	55		
Post-Mitigation	1	1	4	3	18		
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in tl	ne following ways:			
	(1) Development ar	nd implementation	of a water monito	oring program.			
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	d implementation	of a storm water r	management plan.			



- (4) Reporting and recording all related incidents according to a developed procedure.
- (5) Develop and implement an emergency preparedness plan.

Activity:	30. Vehicular activi	30. Vehicular activity on haul roads; and operation					
Impact:	Hydrocarbon Con	tamination					
	Direct Impact: The	e use of vehicles	on haul roads th	roughout the operation	onal phase poses a		
	risk of hydrocarbon	spills if equipme	nt is not maintain	ed. Depending on the	size of the spill the		
	level of contaminat	ion may vary fron	n insignificant to s	significant and may aff	ect the surrounding		
	water quality (both	surface and sub-s	surface) as well as	s the soil quality.			
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	4	1	8	5	65		
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamir	nation can be control	lled in the following		
	ways:						
	(1) Develop and im	plement a Hazaro	dous substances	management plan spe	ecifically addressing		
	handling, storage, a	and transport of h	azardous substan	ces.			
	(2) Develop and implement an emergency response procedure addressing the procedure in						
	case of a chemical	spill. This proced	dure should ensur	re the fastest possible	reaction to spills or		
	accidents as well a	s addressing rem	ediation procedure	es.			
	(3) Development ar	nd implementation	n of an incident re	porting procedure.			

Activity:	32. Water Management					
Impact:	Water level reduct	Water level reduction and contamination				
	Direct Impact: Imp	proper manageme	ent of water usage	and installation of im	proper storm water	
	features and infras	features and infrastructure poses a risk of reducing the water levels for downstream users.				
	Indirect Impact: T	he reduction of wa	ater levels of rivers	s/watercourses/under	ground water tables	
	poses a risk of affe	poses a risk of affecting both surface and sub-surface water resources.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the s	surface water quality of	can be controlled in	
	following ways:					
	(1) Development ar	(1) Development and implementation of water quality monitoring plan.				
	(2) Development of	f a storm water ma	anagement plan.			
	(3) Reporting and r	ecording incidents	S .			



Aspect:

Environmental Impact Assessment Report and Environmental Management Programme report for The Spitsvale Mining Right Application and Associated Activities DMR ref: LP 30/5/1/2/3/2/1 (10104)

	(4) Create awareness of water conservation.							
Impact:	Contamination of	Contamination of water resources						
	Direct Impact: Th	e poor manage	ment of onsite wate	er i.e. Storm water, p	rocess water, effluent,			
	potable water etc.	may lead to the	contamination of v	vater resources.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Contamination of v	vater resources	can be avoided in	the following ways:				
	(1) Development a	ind implementat	tion of a water mon	itoring program.				
	(2) Development	and implement	ation of an Integra	ated Water and Was	ste Management Plan			
	(IWWMP).							
	(3)Development a	nd implementati	on of a storm wate	r management plan.				
	(4) Reporting and	recording all rel	ated incidents acco	ording to a developed	I procedure.			
	(5) Develop and in	nplement an em	ergency preparedn	ness plan.				

Wetlands and Aquatic Ecology

Activity:	18.Topsoil and subsoil stripping & stockpiling for mining operation area						
Impact:	Destruction of We	Destruction of Wetlands					
	Direct Impact: Site	e clearing and to	psoil stripping in \	Netlands will cause th	ne loss of micro and		
	macro aquatic spec	cies.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	5	2	8	5	75		
Post-Mitigation	3	1	6	4	40		
Mitigation Measures:	The potential effect	ts may be avoide	d in the following	ways:			
	(1) Develop a wate	r monitoring man	agement plan.				
	(2) Record and rep	ort all incidents re	elated to affecting	water quality.			
	(3) Develop a reha	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to					
	reinstatement of we	etlands.					
Impact:	Hydrocarbon Con	tamination					
	Direct Impact: Thr	oughout the oper	ational phase cor	struction equipment a	re used. This poses		
	a risk of hydrocarb	on spills if equip	ment is not maint	tained. Depending on	the size of the spill		
	the level of conta	amination may v	ary from insignif	icant to significant a	ind may affect the		
	surrounding water	surrounding water quality (both surface and sub-surface) as well as the soil quality.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		



Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	2	6	2	24	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	led in the following	
	ways:					
	(1) Develop and implement a Hazardous substances management plan specifically addressing					
	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	nplement an eme	ergency response	procedure addressin	g the procedure in	
	case of a chemical	spill. This proced	dure should ensure	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing reme	ediation procedure	es.		
	(3) Development a	nd implementation	of an incident rep	orting procedure.		
Impact:	Sedimentation an	d siltation of wat	ercourses			
	Direct Impact: Stri	pping topsoil and	subsoil or stockpil	ing material through o	or in close proximity	
	to drainage lines	may cause sedir	mentation and sil	tation of watercours	es if not managed	
	properly.					
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause	
	sedimentation and	siltation of nearby	watercourses.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	2	4	3	30	
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the following	g ways:		
	1) Development an	d implementation	of water quality m	onitoring plan.		
	(2) Reporting and r	ecording incidents	S.			
Impact:	Alteration of drain	age patterns				
	Indirect Impact:	Alteration of the	e drainage patte	rns may lead to t	he degradation of	
	downstream or sur	rounding Wetland	s which in its turn	may affect the aquat	ic micro and macro	
	ecology.					
	ecology.					
		te clearing and t	opsoil stripping th	nrough drainage line	s may lead to the	
	Direct Impact: Si	· ·		nrough drainage line ne river banks that wi	•	
	Direct Impact: Si	as well as lead t			•	
Significance rating:	Direct Impact: Single siltation of streams	as well as lead t			•	
Significance rating: Pre-Mitigation	Direct Impact: Si siltation of streams water quality negat	as well as lead t	o erosion along th	ne river banks that wi	Il affect the surface	
	Direct Impact: Si siltation of streams water quality negat Duration	as well as lead tively.	o erosion along the	Probability	Il affect the surface Significance	
Pre-Mitigation	Direct Impact: Sir siltation of streams water quality negated buration 5 4	as well as lead to ively. Extent 2	Magnitude 8 6	Probability 5	Significance 75 33	
Pre-Mitigation Post-Mitigation	Direct Impact: Sir siltation of streams water quality negated buration 5 4	as well as lead to lively. Extent 2 1 face water quality	Magnitude 8 6	Probability 5 3	Significance 75 33	

	(2) Record and rep	ort all incidents re	elated to affecting	water quality.		
	(3) Develop a reha	(3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to				
	reinstatement of dr	reinstatement of drainage lines.				
Impact:			es and reduction	in water in the catch	nment	
iii paoti	•			ge lines may lead to		
	-			•	•	
		rounding Wetland	ds which in its tur	n may affect the aqua	atic micro and macro	
	ecology.					
	Direct Impact: The	e destruction of tr	ibutaries may lea	d to a limited volume	of water available to	
	the downstream us	sers. The reduction	on in water in the	catchment may caus	e the degradation of	
	surface water quali	ty.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	6	5	65	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	The effects on sur	face water quality	resulting from the	ne destruction of upst	ream tributaries and	
	reduction in water i	n the catchment	can be <i>remedied</i>	in the following ways:		
	(1) Develop a wate	r monitoring man	agement plan.			
	(2) Record and rep	ort all incidents re	elated to affecting	water quality.		
	, ,		•	sing the rehabilitation	manauran ralatad ta	
			ECHICANY AUDITESS		measmes related to t	
	reinstatement of dr		ecilically address	ing the renabilitation	measures related to	

Activity:	19.Opencast minin	g excavations					
Impact:	Contamination of water resources						
	Direct Impact: The	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants					
	are used such as h	igh levels of nitra	tes. Improper ma	nagement of potential	pollutants may lead		
	to the degradation	of water quality	(both surface ar	nd sub-surface). Pollut	ed water resources		
	may affect the aqua	atic environment i	n a detrimental n	nanner.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in	the following ways:			
	(1) Development a	nd implementation	n of a water moni	toring program.			
	(2) Development a	and implementation	on of an Integra	ted Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	d implementation	of a storm water	management plan.			
	(4) Reporting and r	ecording all relate	ed incidents acco	rding to a developed p	rocedure.		



	(5) Develop and implement an emergency preparedness plan.									
Impact:	Sedimentation and siltation of watercourses									
	Direct Impact: Stockpiling excavated material through or in close proximity to drainage lines									
	may cause sedimentation and siltation of watercourses if not managed properly.									
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause					
	sedimentation and	siltation of nearby	watercourses.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance					
Pre-Mitigation	4	2	8	5	70					
Post-Mitigation	4	1	6	3	33					
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the followin	g ways:						
	1) Development an	d implementation	of water quality m	onitoring plan.						
	(2) Reporting and r	ecording incidents	5.							
Impact:	Alteration of drain	nage patterns								
	Indirect Impact:	Alteration of the	e drainage patte	rns may lead to t	he degradation of					
	downstream or sur	rounding Wetland	s which in its turn	may affect the aquai	tic micro and macro					
	ecology.									
	Direct Impact: Si	te clearing and t	opsoil stripping tl	nrough drainage line	s may lead to the					
	siltation of streams	as well as lead t	o erosion along th	ne river banks that wi	siltation of streams as well as lead to erosion along the river banks that will affect the surface					
	water quality negatively.									
	water quality negat	ively.								
Significance rating:	Duration Duration	Extent	Magnitude	Probability	Significance					
Significance rating: Pre-Mitigation			Magnitude 8	Probability 5	Significance 75					
	Duration	Extent			-					
Pre-Mitigation	Duration 5	Extent 2	8	5	75 33					
Pre-Mitigation Post-Mitigation	Duration 5	Extent 2 1 face water quality	8	5	75 33					
Pre-Mitigation Post-Mitigation	Duration 5 4 The effects on sur	Extent 2 1 face water quality llowing ways:	8 6 resulting from th	5	75 33					
Pre-Mitigation Post-Mitigation	Duration 5 4 The effects on sur remedied in the fo	Extent 2 1 face water quality flowing ways: r monitoring mana	8 6 resulting from the	5 3 e alteration in draina	75 33					
Pre-Mitigation Post-Mitigation	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representations.	Extent 2 1 face water quality flowing ways: r monitoring mana ort all incidents re	8 6 resulting from the agement plan. lated to affecting v	5 3 e alteration in draina	75 33 ge patterns can be					
Pre-Mitigation Post-Mitigation	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representations.	Extent 2 1 face water quality flowing ways: r monitoring mana ort all incidents re abilitation plan spe	8 6 resulting from the agement plan. lated to affecting v	5 3 e alteration in draina	75 33 ge patterns can be					
Pre-Mitigation Post-Mitigation	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representation (3) Develop a reharming reinstatement of driving the development of the development (3) Development (3) Development (3) Development (4) Development (4) Development (5) Development (6) Development	Extent 2 1 face water quality llowing ways: r monitoring mana ort all incidents re abilitation plan special	8 6 resulting from the agement plan. lated to affecting vecifically addressing addressin	5 3 e alteration in draina	75 33 ge patterns can be					
Pre-Mitigation Post-Mitigation Mitigation Measures:	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representation (3) Develop a reharm reinstatement of dr. Destruction of up:	Extent 2 1 face water quality llowing ways: r monitoring mana ort all incidents re abilitation plan special ainage lines. stream tributarie	8 6 resulting from the agement plan. lated to affecting vecifically addressing and reduction in	5 3 e alteration in draina vater quality. ng the rehabilitation r	75 33 ge patterns can be measures related to ment					
Pre-Mitigation Post-Mitigation Mitigation Measures:	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representation (3) Develop a rehamination of driving the control of the control	Extent 2 1 face water quality flowing ways: r monitoring mana ort all incidents reabilitation plan special	8 6 resulting from the agement plan. lated to affecting vecifically addressing and reduction is and reduction in apstream drainage.	5 3 e alteration in draina vater quality. ng the rehabilitation r	75 33 ge patterns can be measures related to ment the degradation of					
Pre-Mitigation Post-Mitigation Mitigation Measures:	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representation (3) Develop a rehamination of driving the control of the control	Extent 2 1 face water quality flowing ways: r monitoring mana ort all incidents reabilitation plan special	8 6 resulting from the agement plan. lated to affecting vecifically addressing and reduction is and reduction in apstream drainage.	5 3 e alteration in draina vater quality. ng the rehabilitation r n water in the catch e lines may lead to	75 33 ge patterns can be measures related to ment the degradation of					
Pre-Mitigation Post-Mitigation Mitigation Measures:	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and represent (3) Develop a rehater instatement of drawnstream or sur ecology.	Extent 2 1 face water quality flowing ways: r monitoring mana ort all incidents re abilitation plan special ainage lines. stream tributarie Alteration of the uncounding Wetland	8 6 resulting from the agement plan. lated to affecting vecifically addressing and reduction is and reduction is which in its turn	5 3 e alteration in draina vater quality. ng the rehabilitation r n water in the catch e lines may lead to	75 33 age patterns can be measures related to ment the degradation of tic micro and macro					
Pre-Mitigation Post-Mitigation Mitigation Measures:	Duration 5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and represent (3) Develop a rehater instatement of drawnstream or surrecology. Direct Impact: The	Extent 2 1 face water quality flowing ways: r monitoring mana ort all incidents re abilitation plan special ainage lines. stream tributaries Alteration of the re rounding Wetland e destruction of tri	8 6 resulting from the agement plan. lated to affecting vecifically addressing and reduction is and reduction is which in its turn butaries may lead	5 3 e alteration in drainal vater quality. In water in the catch e lines may lead to may affect the aquain	75 33 age patterns can be measures related to ment the degradation of tic micro and macro of water available to					



Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	The effects on surf	face water quality	resulting from the	e destruction of upstr	eam tributaries and
	reduction in water i	n the catchment o	an be <i>remedied</i> i	n the following ways:	
	(1) Develop a wate	r monitoring mana	agement plan.		
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.	
	(3) Develop a reha	abilitation plan spe	ecifically addressi	ng the rehabilitation r	neasures related to
	reinstatement of dr	ainage lines.			

Activity:	20.Drilling & Blastir	20.Drilling & Blasting					
Impact:	Contamination of	Contamination of water resources					
	Direct Impact: Improper management of blasting activities poses the risk of contaminating water resources with pollutants such as high content of Nitrates. The presence of pollutants in the water resources poses a risk of degrading the conditions for the aquatic ecology to thrive.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	he following ways:			
	(1) Development ar	nd implementation	of a water monito	oring program.			
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan		
	(IWWMP).						
	(3)Development an	d implementation	of a storm water	management plan.			
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed pr	ocedure.		
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.			

Activity:	21. RoM & product stockpiling						
Impact:	Contamination of water resources						
	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants						
	are used such as h	are used such as high levels of nitrates. Improper management of potential pollutants may lead					
	to the degradation	of water quality	(both surface and	l sub-surface). Pollute	ed water resources		
	may affect the aqua	atic environment ir	n a detrimental ma	anner.			
	Indirect Impact: S	ub-surface materi	al and ore expos	ed to weathering mag	y release pollutants		
	to the water resource	ces.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		



Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Contamination of water resources can be avoided in the following ways:							
	(1) Development and implementation of a water monitoring program.							
	(2) Development and implementation of an Integrated Water and Waste Management Plan							
	(IWWMP).	(IWWMP).						
	(3)Development an	(3)Development and implementation of a storm water management plan.						
	(4) Reporting and r	ecording all relate	d incidents accor	ding to a developed p	ocedure.			
	(5) Develop and im	plement an emer	gency preparedne	ess plan.				
Impact:	Sedimentation an	d siltation of wat	ercourses					
	Direct Impact: Sto	ckpiling RoM and	I product material	through or in close p	roximity to drainage			
	lines may cause	sedimentation a	nd siltation of v	vatercourses if not	managed properly.			
	Indirect Impact:	Storm water rur	off of dirt road	s and un-vegetated	areas may cause			
	sedimentation and	siltation of nearby	watercourses.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Surface water qual	ty can be <i>contro</i>	lled in the following	ig ways:				
	1) Development an	d implementation	of water quality m	nonitoring plan.				
	(2) Reporting and r	ecording incidents	5.					

Activity:	22. Residue stockp	iles					
Impact:	Contamination of water resources						
	Direct Impact: Throughout the operational phase of the mining operations, potential pollutants						
	are used such as high levels of nitrates. Improper management of potential pollutants may lead						
	to the degradation	of water quality	(both surface ar	nd sub-surface). Pollut	ed water resources		
	may affect the aqua	atic environment	in a detrimental m	nanner.			
	Indirect Impact: S	Sub-surface mate	rial and ore expo	sed to weathering ma	y release pollutants		
	to the water resour	ces.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	8	5	70		
Post-Mitigation	4	1	6	3	33		
Mitigation Measures:	Contamination of w	ater resources c	an be avoided in	the following ways:			
	(1) Development a	nd implementatio	n of a water moni	toring program.			
	(2) Development a	and implementati	on of an Integra	ted Water and Waste	Management Plan		

	(IWWMP).									
	(3)Development and implementation of a storm water management plan.									
		•			raadura					
	(4) Reporting and recording all related incidents according to a developed procedure.									
	. ,	(5) Develop and implement an emergency preparedness plan. Sedimentation and siltation of watercourses								
Impact:										
	-	, •	•	in close proximity to	, ,					
	cause sedimenta	ation and silta	tion of watero	ourses if not m	anaged properly.					
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause					
	sedimentation and	siltation of nearby	watercourses.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance					
Pre-Mitigation	4	2	8	5	70					
Post-Mitigation	4	1	6	3	33					
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the following	g ways:						
	1) Development an	d implementation	of water quality m	onitoring plan.						
	(2) Reporting and r	ecording incidents	S.							
Impact:	Alteration of drair	nage patterns								
	Indirect Impact:	Alteration of the	e drainage patte	rns may lead to t	he degradation of					
	downstream or sur	rounding Wetland	s which in its turn	may affect the aquat	ic micro and macro					
	ecology.	· ·								
		te clearing and t	opsoil stripping th	nrough drainage line	s may lead to the					
	-	·			Direct Impact : 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 that will affect the surface					
					Il affect the surface					
Significance rating:		water quality negatively.								
	Duration	Extent	Magnitude	Probability						
Pre-Mitigation		Extent 2	Magnitude 8	Probability 5	Il affect the surface Significance 75					
Pre-Mitigation Post-Mitigation	5		8	5	Significance					
Post-Mitigation	5	2	8 6	5 3	Significance 75 33					
	5 4 The effects on sur	2 1 face water quality	8 6	5	Significance 75 33					
Post-Mitigation	5 4 The effects on sur remedied in the fo	2 1 face water quality	8 6 resulting from th	5 3	Significance 75 33					
Post-Mitigation	5 4 The effects on sur remedied in the fo (1) Develop a wate	2 1 face water quality llowing ways: r monitoring mana	8 6 r resulting from th	5 3 e alteration in draina	Significance 75 33					
Post-Mitigation	5 4 The effects on sur remedied in the fo (1) Develop a wate (2) Record and rep	2 1 face water quality flowing ways: r monitoring mana ort all incidents re	8 6 resulting from that agement plan. lated to affecting v	5 3 e alteration in draina	Significance 75 33 ge patterns can be					
Post-Mitigation	5 4 The effects on sur <i>remedied</i> in the fo (1) Develop a wate (2) Record and rep (3) Develop a reha	2 1 face water quality flowing ways: r monitoring mana ort all incidents re abilitation plan spe	8 6 resulting from that agement plan. lated to affecting v	5 3 e alteration in draina	Significance 75 33 ge patterns can be					
Post-Mitigation Mitigation Measures:	5 4 The effects on sur remedied in the form (1) Develop a wate (2) Record and representation (3) Develop a reharming terms are the reinstatement of dr	2 1 face water quality flowing ways: or monitoring mana ort all incidents re abilitation plan special	8 6 resulting from that agement plan. lated to affecting v	5 3 e alteration in draina	Significance 75 33 ge patterns can be					
Post-Mitigation	5 4 The effects on sur remedied in the form (1) Develop a water (2) Record and representation (3) Develop a reharm reinstatement of drawardous Leach	2 1 face water quality flowing ways: or monitoring mana ort all incidents re abilitation plan special ainage lines.	8 6 resulting from the agement plan. lated to affecting vecifically addressing	5 3 e alteration in draina vater quality. ng the rehabilitation n	75 33 ge patterns can be					
Post-Mitigation Mitigation Measures:	5 4 The effects on sur remedied in the form (1) Develop a wate (2) Record and representation (3) Develop a rehatement of draw Hazardous Leach Direct Impact: Po	2 1 face water quality flowing ways: r monitoring mana ort all incidents re abilitation plan special ainage lines. ate tential pollutant in	8 6 resulting from the agement plan. lated to affecting vecifically addressing the residue maters.	5 3 e alteration in draina vater quality. In the rehabilitation i	Significance 75 33 ge patterns can be neasures related to ning operation may					
Post-Mitigation Mitigation Measures:	5 4 The effects on sur remedied in the form (1) Develop a wate (2) Record and representation (3) Develop a rehatement of draw Hazardous Leach Direct Impact: Po	1 face water quality flowing ways: or monitoring mana ort all incidents re abilitation plan special ainage lines. ate tential pollutant in on of leachate. Ti	8 6 r resulting from the agement plan. lated to affecting vecifically addressing the residue mate the leachate may of	5 3 e alteration in draina vater quality. ng the rehabilitation n	Significance 75 33 ge patterns can be neasures related to ning operation may					



Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	8	5	75
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Formed hazardous	leachate can be	controlled in the	following ways:	
	(1) Design and imp	lement a Integrate	ed Waste Water M	lanagement Plan (IW	WMP).
	(2) Develop and im	plement a water o	quality manageme	nt plan.	
	(3) Report and reco	ord any incidents r	elated to hazardo	us leachates.	

Activity:	23. Screening Ope	23. Screening Operations				
Impact:	Contamination of water resources					
	Direct Impact: V	Direct Impact: Water seeping from stockpiles poses a risk of leading to elevated				
	concentrations of h	eavy metals and	other elements in	n the groundwater en	vironment, and can	
	potentially be acidi	c. When this wate	er reaches surface	e water bodies or the	groundwater it can	
	negatively affect the	e water quality.				
	Indirect Impact: A	Iteration to the co	onditions of the w	ater resources may r	negatively affect the	
	aquatic ecology.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	ne following ways:		
	(1) Development ar	nd implementation	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water r	management plan.		
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed p	rocedure.	
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.		
Impact:	Sedimentation and	d siltation of wat	ercourses			
	Direct Impact: Sto	ockpiling screene	d material througl	n or in close proximi	ty to drainage lines	
	may cause sedi	mentation and	siltation of wat	ercourses if not r	managed properly.	
	Indirect Impact:	Storm water rur	off of dirt roads	s and un-vegetated	areas may cause	
	sedimentation and	siltation of nearby	watercourses.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Surface water qual	ty can be <i>control</i>	led in the followin	g ways:		



ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES DMR REF: LP 30/5/1/2/3/2/1 (10104)

- Development and implementation of water quality monitoring plan.
 Reporting and recording incidents.
- 24. Discard disposal (backfilling of mining area) Activity: Impact: **Contamination of water resources Direct Impact:** Throughout the operational phase of the mining operations, potential pollutants are used such as high levels of nitrates. Improper management of potential pollutants may lead to the degradation of water quality (both surface and sub-surface). Polluted water resources may affect the aquatic environment in a detrimental manner. Indirect Impact: Sub-surface material and ore exposed to weathering may release pollutants to the water resources. Significance rating: Duration **Probability** Significance **Extent** Magnitude **Pre-Mitigation** 4 8 5 4 27 **Post-Mitigation** 3 **Mitigation Measures:** Contamination of water resources can be **avoided** in the following ways: (1) Development and implementation of a water monitoring program. (2) Development and implementation of an Integrated Water and Waste Management Plan (IWWMP). (3)Development and implementation of a storm water management plan. (4) Reporting and recording all related incidents according to a developed procedure. (5) Develop and implement an emergency preparedness plan. Sedimentation and siltation of watercourses Impact: Direct Impact: Backfilling material through or in close proximity to drainage lines may cause sedimentation and siltation of watercourses if not managed properly. Indirect Impact: Storm water runoff of dirt roads and un-vegetated areas may cause sedimentation and siltation of nearby watercourses. Duration Significance rating: **Extent** Magnitude **Probability** Significance **Pre-Mitigation** 4 2 8 5 70 3 **Post-Mitigation** 4 33 **Mitigation Measures:** Surface water quality can be *controlled* in the following ways: 1) Development and implementation of water quality monitoring plan. (2) Reporting and recording incidents.

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

Activity:	25. Waste generation, storage and disposal				
Impact:	Contamination of water resources				
	Direct Impact: Th	e storage of large	e amounts of was	te over an extended	time in a area not
	lined or bunde	d poses a	risk of formin	g potentially haza	ardous leachates.
	Indirect Impact:	The hazardous le	achate from the	waste storage faciliti	es poses a risk of
	contaminating both	surface and sub-	surface water reso	ources. This may lead	d to the degradation
	of conditions for the	e aquatic ecology	to thrive.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	8	5	70
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development and implementation of an Integrated Water and Waste Management Pla (IWWMP).				Management Plan
	(3)Development an	d implementation	of a storm water r	nanagement plan.	
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed pr	rocedure.
	(5) Develop and im	plement an emerg	gency preparedne	ss plan.	
Impact:	Hazardous Leach	ate			
	Direct Impact: Th	ne hazardous lea	chate from the v	vaste storage facilitie	es poses a risk of
	contaminating both	surface and sub-	-surface water as	well as soil resource	s. This may lead to
	the degradation of	conditions for the	aquatic ecology to	thrive.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	8	5	75
Post-Mitigation	4	1	4	2	18
Mitigation Measures:	Formed hazardous	leachate can be	controlled in the f	ollowing ways:	
	(1) Design and imp	lement a Integrate	ed Waste Water M	anagement Plan (IW)	WMP).
	(2) Develop and im	plement a water q	uality manageme	nt plan.	
	(3) Report and reco	ord any incidents r	elated to hazardo	us leachates.	

Activity:	26. Chemical Toilets
Impact:	Contamination of water resources
	Direct Impact: Improper management of effluent from chemical toilets poses a high risk to
	contaminating water resources.
	Indirect Impact: 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



Significance rating:	quality.						
	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	6	5	40		
Post-Mitigation	1	1	4	2	12		
Mitigation Measures:	Contamination of v	vater resources ca	an be avoided in	the following ways:			
	(1) Development a	nd implementatio	n of a water mon	itoring program.			
	(2) Development a	and implementati	on of an Integra	ited Water and Wa	ste Management Plar		
	(IWWMP).						
	(3)Development and implementation of a storm water management plan.						
	(4) Reporting and recording all related incidents according to a developed procedure.						
	(5) Develop and implement an emergency preparedness plan.						

Activity:	27. River crossings				
Impact:	Contamination of	Contamination of water resources			
	Direct Impact: Sto	Direct Impact: Storm water run-off from river crossing structures containing pollutants poses a			
	risk in contaminatin	g the surrounding	water resources.		
	Indirect Impact: F	Pollutants poses a	a risk in altering t	the conditions of the	aquatic ecology to
	thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	(3)Development and implementation of a storm water management plan.			
	(4) Reporting and recording all related incidents according to a developed procedure.				ocedure.
	(5) Develop and implement an emergency preparedness plan.				
Impact:	Sedimentation and	d siltation of wat	ercourses		
	Direct Impact: Exc	cavating, stockpilir	ng and transport o	f material through or i	in close proximity to
	drainage lines may	cause sedimenta	ition and siltation	of watercourses if not	managed properly.
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause
	sedimentation and	siltation of nearby	watercourses.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70



Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Surface water qual	ity can be <i>control</i>	led in the following	g ways:		
	1) Development an	Development and implementation of water quality monitoring plan.				
	(2) Reporting and recording incidents.					
Impact:	Alteration of drain	Alteration of drainage patterns				
	Indirect Impact:	ndirect Impact: Alteration of the drainage patterns may lead to the degradation of				
	downstream or sur	rounding Wetland	s which in its turr	may affect the aqua	tic micro and macro	
	ecology.					
	Direct Impact: Si	te clearing and t	opsoil stripping t	hrough drainage line	s may lead to the	
	siltation of streams	as well as lead t	o erosion along t	he river banks that w	ill affect the surface	
	water quality negat	ively.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	8	5	75	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	The effects on sur	The effects on surface water quality resulting from the alteration in drainage patterns can be				
	remedied in the fol	lowing ways:				
	(1) Develop a wate	r monitoring mana	agement plan.			
	(2) Record and report all incidents related to affecting water quality.					
	(3) Develop a reha	abilitation plan spe	ecifically addressi	ng the rehabilitation i	neasures related to	
	reinstatement of drainage lines.					

Activity:	28. Water supply (potable & process)				
Impact:	Contamination of	Contamination of water resources Direct Impact: Leaks and breaks of water supply infrastructure poses a risk of contaminating water resources.			
	Direct Impact: Lea				
	water resources.				
	Indirect Impact: Pollutants poses a risk in altering the conditions of the aquatic ecology to				aquatic ecology to
	thrive.	thrive.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	8	5	70
Post-Mitigation	4	1	2	2	14
Mitigation Measures:	Contamination of w	Contamination of water resources can be <i>avoided</i> in the following ways:			
	(1) Development and implementation of a water monitoring program.				
	(2) Development and implementation of an Integrated Water and Waste Management Plan			Management Plan	
	(IWWMP).				
	(3)Development an	d implementation	of a storm water i	management plan.	



- (4) Reporting and recording all related incidents according to a developed procedure.
- (5) Develop and implement an emergency preparedness plan.

Activity:	29. Storage of fuel	29. Storage of fuel and lubricants in temporary facilities				
Impact:	Contamination of	water resources				
	Direct Impact: T	Direct Impact: The use of improper storage facilities poses a risk of the surrounding environment to be exposes to continuous leaking of hydrocarbons leading possibly contaminating surface and sub-surface water sources as well as the soils surrounding the				
	environment to b					
	contaminating surf					
	facility.	•				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	1	8	5	55	
Pre-willigation	2	I	0	J J	55	
Post-Mitigation	1	1	6	2	16	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	he following ways:		
	(1) Development ar	(1) Development and implementation of a water monitoring program.				
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).			-		
	(3)Development and implementation of a storm water management plan.					
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed pr	ocedure.	
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.		

Activity:	30. Vehicular activity on haul roads; and operation of mining equipment					
Impact:	Sedimentation and siltation of watercourses					
	Direct Impact: Co	Direct Impact: Constructing access roads through drainage lines may cause sedimentation				
	and siltation of water	and siltation of watercourses if not managed properly.				
	Indirect Impact: S	Storm water rund	off of dirt roads i	may cause sediment	ation and siltation of	
	nearby watercourse	es.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4 1 6 3 33					
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:					
	1) Development and implementation of water quality monitoring plan.					
	(2) Reporting and r	ecording inciden	ts.			



Activity:	32. Water Management					
Impact:	Contamination of	water resources				
	Direct Impact: The	e poor manageme	nt of onsite water	i.e. Storm water, prod	cess water, effluent,	
	potable water etc. r	potable water etc. may lead to the contamination of water resources.				
Significance rating:	Duration	Ouration Extent Magnitude Probability Significance				
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Contamination of w	rater resources ca	n be avoided in th	ne following ways:		
	(1) Development ar	nd implementation	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water r	nanagement plan.		
	(4) Reporting and r	ecording all relate	d incidents accord	ling to a developed p	rocedure.	
	(5) Develop and im	plement an emerg	gency preparedne	ss plan.		
Impact:	Sedimentation and	d siltation of wat	ercourses			
	Direct Impact: Rui	noff from lay dow	n areas, construct	ion areas, mining are	as, stockpile areas,	
	roads etc. potential	lly contain sedime	ent and silt that po	ses a risk of affecting	g surrounding water	
	courses and draina	ge lines.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:					
	Surface water qual	ity can be <i>control</i>	led in the followin	g ways:		
	Development an	•		•		
	•	d implementation	of water quality m	•		
Impact:	1) Development an	d implementation ecording incidents	of water quality m	•		
•	Development an (2) Reporting and re Alteration of drain	d implementation ecording incidents	of water quality m	•	he degradation of	
•	1) Development and (2) Reporting and real Alteration of drain Indirect Impact:	d implementation ecording incidents rage patterns Alteration of the	of water quality m s. e drainage patte	onitoring plan.	•	
•	1) Development and (2) Reporting and real Alteration of drain Indirect Impact:	d implementation ecording incidents rage patterns Alteration of the	of water quality m s. e drainage patte	erns may lead to t	•	
•	1) Development and (2) Reporting and real Alteration of drain Indirect Impact: downstream or surrecology.	d implementation ecording incidents nage patterns Alteration of the rounding Wetland	of water quality m s. e drainage patte s which in its turn	erns may lead to t	tic micro and macro	
•	1) Development and (2) Reporting and real Alteration of drain Indirect Impact: downstream or surrecology. Direct Impact: Site	d implementation ecording incidents rage patterns Alteration of the rounding Wetland te clearing and t	of water quality mes. e drainage patters which in its turn opsoil stripping the	erns may lead to to may affect the aquate	tic micro and macro	
•	1) Development and (2) Reporting and real Alteration of drain Indirect Impact: downstream or surrecology. Direct Impact: Site	d implementation ecording incidents rage patterns Alteration of the rounding Wetland te clearing and to as well as lead to	of water quality mes. e drainage patters which in its turn opsoil stripping the	erns may lead to to may affect the aqual	tic micro and macro	
•	1) Development and (2) Reporting and recology. Alteration of drain Indirect Impact: downstream or surrecology. Direct Impact: Sit siltation of streams.	d implementation ecording incidents rage patterns Alteration of the rounding Wetland te clearing and to as well as lead to	of water quality mes. e drainage patters which in its turn opsoil stripping the	erns may lead to to may affect the aqual	tic micro and macro	
Impact:	1) Development and (2) Reporting and recolor and recol	d implementation ecording incidents rage patterns Alteration of the rounding Wetland te clearing and to as well as lead to ively.	of water quality mes. e drainage patters which in its turn opsoil stripping the operation of the content of th	erns may lead to to may affect the aquate hrough drainage line he river banks that wi	tic micro and macro as may lead to the till affect the surface	
Impact: Significance rating:	1) Development and (2) Reporting and recolor and Indirect Impact: downstream or surrecology. Direct Impact: Sit siltation of streams water quality negation	d implementation ecording incidents rage patterns Alteration of the rounding Wetland te clearing and the as well as lead to ively.	of water quality mes. e drainage patters which in its turn opsoil stripping to erosion along the magnitude	erns may lead to to may affect the aquate hrough drainage line he river banks that with the probability	tic micro and macro as may lead to the fill affect the surface Significance	

remedied in the fol	lowing ways:				
(1) Develop a wate	r monitoring mana	igement plan.			
(2) Record and rep	(2) Record and report all incidents related to affecting water quality. (3) Develop a rehabilitation plan specifically addressing the rehabilitation measures related to				
(3) Develop a reha					
reinstatement of drainage lines.					
Destruction of up:	Destruction of upstream tributaries and reduction in water in the catchment				
Indirect Impact: A	Indirect Impact: Alteration of the upstream drainage lines may lead to the degradation of				
downstream or sur	rounding Wetland	s which in its turr	may affect the aquat	tic micro and macro	
ecology.					
Direct Impact: The	e destruction of tri	butaries may lead	to a limited volume of	of water available to	
the downstream us	ers. The reductio	n in water in the	catchment may cause	the degradation of	
surface water quali	ty.				
Duration	Extent	Magnitude	Probability	Significance	
4	2	8	5	70	
4	1	4	3	27	
The effects on surf	ace water quality	resulting from th	e destruction of upstr	eam tributaries and	
reduction in water i	n the catchment c	an be remedied i	n the following ways:		
(1) Develop a water monitoring management plan.					
(2) Record and report all incidents related to affecting water quality.					
(3) Develop a reha	bilitation plan spe	ecifically addressi	ng the rehabilitation r	neasures related to	
reinstatement of dr	ainage lines.				
	(1) Develop a wate (2) Record and rep (3) Develop a rehall reinstatement of dragger of the downstream or surface water quality and the downstream uses of the downstream of th	(2) Record and report all incidents re (3) Develop a rehabilitation plan species reinstatement of drainage lines. Destruction of upstream tributaries. Indirect Impact: Alteration of the education of trick the downstream users. The reduction surface water quality. Duration Extent 4 2 4 1 The effects on surface water quality reduction in water in the catchment of (1) Develop a water monitoring manage (2) Record and report all incidents research as a surface water and the catchment of (2) Record and report all incidents research.	(1) Develop a water monitoring management plan. (2) Record and report all incidents related to affecting (3) Develop a rehabilitation plan specifically addressi reinstatement of drainage lines. Destruction of upstream tributaries and reduction Indirect Impact: Alteration of the upstream drainage downstream or surrounding Wetlands which in its turn ecology. Direct Impact: The destruction of tributaries may lead the downstream users. The reduction in water in the surface water quality. Duration Extent Magnitude 4 2 8 4 1 4 The effects on surface water quality resulting from the reduction in water in the catchment can be remedied in (1) Develop a water monitoring management plan. (2) Record and report all incidents related to affecting (3) Develop a rehabilitation plan specifically addressi	(1) Develop a water monitoring management plan. (2) Record and report all incidents related to affecting water quality. (3) Develop a rehabilitation plan specifically addressing the rehabilitation reinstatement of drainage lines. Destruction of upstream tributaries and reduction in water in the catch Indirect Impact: Alteration of the upstream drainage lines may lead to downstream or surrounding Wetlands which in its turn may affect the aqual ecology. Direct Impact: The destruction of tributaries may lead to a limited volume of the downstream users. The reduction in water in the catchment may cause surface water quality. Duration Extent Magnitude Probability 4 2 8 5 4 1 4 3 The effects on surface water quality resulting from the destruction of upstr reduction in water in the catchment can be remedied in the following ways: (1) Develop a water monitoring management plan. (2) Record and report all incidents related to affecting water quality. (3) Develop a rehabilitation plan specifically addressing the rehabilitation related to a feeting water quality.	

Activity:	33. Rehabilitation of mining areas					
Impact:	Sedimentation and	Sedimentation and siltation of watercourses				
	Direct Impact: Ru	Direct Impact: Runoff from exposed un-vegetated areas poses a risk in contaminating nearby				
	streams, rivers, and	streams, rivers, and drainage lines.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	6	3	33	
Mitigation Measures:	Surface water qual	Surface water quality can be <i>controlled</i> in the following ways:				
	1) Development and implementation of water quality monitoring plan.					
	(2) Reporting and r	2) Reporting and recording incidents.				



Aspect:	Water resource users and management

Activity:	18.Topsoil and sub	soil stripping & st	ockpiling for mini	ng operation area	
Impact:	Water level reduc	tion and contam	ination		
	Direct Impact: Th	e reduction in wa	iter levels as we	ll as contamination	of the water resource
	that may be cause	ed by alternating	the topography	during site clearing	and topsoil stripping
	poses a risk to affe	ecting the surface	and sub-surface	e water quality as we	ell as the downstream
	users.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	2	18
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the	surface water qualit	y can be controlled in
	following ways:				
	(1) Development a	nd implementatior	n of water quality	monitoring plan.	
	(2) Development of	f a storm water ma	anagement plan.		
	(3) Reporting and r	ecording incidents	S.		
	(4) Create awarene	ess of water conse	ervation.		
Impact:	Destruction of up	stream tributarie	s and reduction	in water in the cate	chment
	Indirect Impact: /	Alteration of the	upstream draina	ge lines may lead	to the degradation of
	downstream or sur	rounding Wetland	ls which in its tur	n may affect the aqu	uatic micro and macro
	ecology.				
	Direct Impact: The	e destruction of tri	butaries may lea	d to a limited volume	e of water available to
	the downstream us	sers. The reduction	n in water in the	catchment may cau	ise the degradation of
	surface water quali	ty.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	6	5	65
Post-Mitigation	4	1	4	2	18
Mitigation Measures:	The effects on sur	face water quality	resulting from t	he destruction of up	stream tributaries and
	reduction in water i	n the catchment of	can be <i>remedied</i>	in the following way	s:
	(1) Develop a wate	r monitoring mana	agement plan.		
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.	
	(3) Develop a reha	abilitation plan spe	ecifically address	sing the rehabilitation	n measures related to
	reinstatement of dr	ainage lines.			



Activity:	19.Opencast mining	g excavations				
Impact:	Destruction of upstream tributaries and reduction in water in the catchment					
	Indirect Impact: A	Alteration of the i	upstream drainag	e lines may lead to	the degradation of	
	downstream or sur	rounding Wetland	s which in its turn	may affect the aquat	tic micro and macro	
	ecology.	ecology.				
	Direct Impact: The	Direct Impact: The destruction of tributaries may lead to a limited volume of water available to				
	the downstream users. The reduction in water in the catchment may cause the degradation of					
	surface water quali	surface water quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	6	5	65	
Post-Mitigation	4	1	4	2	18	
Mitigation Measures:	The effects on surf	ace water quality	resulting from the	e destruction of upstr	eam tributaries and	
	reduction in water i	n the catchment c	an be <i>remedied</i> i	n the following ways:		
	(1) Develop a wate	r monitoring mana	gement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting v	water quality.		
	(3) Develop a reha	bilitation plan spe	ecifically addressing	ng the rehabilitation r	neasures related to	
	reinstatement of dra	ainage lines.				

Activity:	27. River crossings					
Impact:	Water level reduct	tion and contami	ination			
	Direct Impact: Imp	proper installation	of river crossing i	nfrastructures poses	a risk in water level	
	reduction and conta	reduction and contamination of downstream water users i.e. through blocking of the natural flow				
	of streams/rivers.	of streams/rivers.				
	Indirect Impact: The reduction of water levels of rivers/watercourses poses a risk of affecting					
	both surface and su	both surface and sub-surface water resources.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	2	2	14	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the	surface water quality of	can be controlled in	
	following ways:					
	(1) Development ar	nd implementation	n of water quality r	nonitoring plan.		
	(2) Development of	f a storm water ma	anagement plan.			
	(3) Reporting and r	ecording incidents	3.			
	(4) Create awarene	ess of water conse	ervation.			

Activity:	28. Water supply (p	28. Water supply (potable & process)				
Impact:	Water level reduct	Water level reduction and contamination				
	Direct Impact: Wa	ter wastage and	over exploitation	of water resources po	oses a risk in water	
	level reduction.					
	Indirect Impact: Ti	ne reduction of wa	ater levels of rivers	s/watercourses/underg	ground water tables	
	poses a risk of affecting both surface and sub-surface water resources.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	2	2	14	
Mitigation Measures:	Water level reduction	Water level reduction and contamination affecting the surface water quality can be controlled in				
	following ways:					
	(1) Development ar	nd implementation	of water quality n	nonitoring plan.		
	(2) Development of	a storm water ma	nagement plan.			
	(3) Reporting and r	ecording incidents	S.			
	(4) Create awarene	ess of water conse	rvation.			

Activity:	32. Water Management					
Impact:	Improper water st	Improper water storage management				
	Direct Impact: Improper management of water storage facilities i.e. Not inspecting or regularly					
	maintaining the storage tanks pose a risk of leaks and contamination.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	The following mitiga	ation measures ca	n be implemented	d to <i>avoid</i> the usage of	of water resources:	
	(1) Water usage mo	onitoring plan to b	e developed and i	mplemented.		
	(2) Create awarene	ess of water conse	ervation.			
Impact:	Water level reduct	tion and contami	nation			
	Direct Impact: Imp	oroper manageme	ent of water usage	and installation of im	proper storm water	
	features and infras	structure poses a	risk of reducing	the water levels for	downstream users.	
	Indirect Impact: T	he reduction of wa	ater levels of rivers	s/watercourses/under	ground water tables	
	poses a risk of affe	cting both surface	and sub-surface	water resources.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Water level reduction	on and contamina	tion affecting the s	surface water quality of	can be controlled in	

	following ways:					
	(1) Development ar	nd implementation	of water quality r	nonitoring plan.		
	(2) Development of	(2) Development of a storm water management plan.				
	(3) Reporting and r	ecording incidents	S.			
	(4) Create awarene	ess of water conse	ervation.			
Impact:	Destruction of up:	stream tributarie	s and reduction	in water in the catch	ment	
	Indirect Impact: A	Alteration of the	upstream drainag	e lines may lead to	the degradation of	
	downstream or sur	rounding Wetland	s which in its turr	may affect the aquat	tic micro and macro	
	ecology.					
	Direct Impact: The	Direct Impact: The destruction of tributaries may lead to a limited volume of water available to				
	the downstream us	ers. The reductio	n in water in the	catchment may cause	the degradation of	
	surface water quali	ty.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	8	5	70	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	The effects on surf	ace water quality	resulting from th	e destruction of upstr	eam tributaries and	
	reduction in water i	n the catchment o	an be <i>remedied</i> i	n the following ways:		
	(1) Develop a wate	r monitoring mana	igement plan.			
	(2) Record and rep	ort all incidents re	lated to affecting	water quality.		
	(3) Develop a reha	bilitation plan spe	ecifically addressi	ng the rehabilitation r	neasures related to	
	reinstatement of dra	ainage lines.				

Aspect: Soil Quality

Activity:	18.Topsoil and sub	soil stripping & st	ockpiling for minir	ng operation area	
Impact:	Degradation of so	il resources			
	Direct Impact: If I	not managed pro	perly, fertile soil	will be lost during sit	e clearance, topsoil
	striping and stockp	iling. Loss of fert	ile soil will cause	the degradation of ha	bitat for flora micro-
	and macro organis	ms.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	1	6	5	50
Post-Mitigation	3	1	4	3	24
Mitigation Measures:	Degradation of soil	resources can be	e remedied in the	following ways:	
	(1) Develop and im	plement soil cons	servation and stoc	kpile management pla	an.
	(2) Develop and im	plement a Rehab	ilitation plan.		

Activity:	19.Opencast minin	g excavations			
Impact:	Hydrocarbon Con				
			ational phase cons	struction equipment a	re used. This poses
	-		•	ained. Depending on	
	_			cant to significant a	•
		•	•	e) as well as the soil	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	8	5	65
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>contro</i>	<i>lled</i> in the following
	ways:				
	(1) Develop and im	plement a Hazaro	dous substances r	management plan spe	ecifically addressing
	handling, storage, a	and transport of ha	azardous substan	ces.	
	(2) Develop and ir	nplement an eme	rgency response	procedure addressir	ng the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well a	s addressing reme	ediation procedure	es.	
	(3) Development a	nd implementation	of an incident rep	orting procedure.	
Impact:	Degradation of so	il resources			
	Direct Impact: If I	not managed prop	perly, fertile soil v	vill be lost during site	e clearance, topsoil
					, I
	striping and stockp	iling. Loss of fertil	e soil will cause t	he degradation of ha	•
	striping and stockp	•	e soil will cause t	he degradation of ha	•
Significance rating:		•	e soil will cause t	he degradation of ha	•
Significance rating: Pre-Mitigation	and macro organis	ms.		•	bitat for flora micro-
	and macro organism	ms.	Magnitude	Probability	bitat for flora micro-
Pre-Mitigation	and macro organism Duration 5	ms. Extent 1	Magnitude 6 4	Probability 5	Significance 60
Pre-Mitigation Post-Mitigation	and macro organism Duration 5 4 Degradation of soil	ms. Extent 1 1 resources can be	Magnitude 6 4 remedied in the	Probability 5	Significance 60 27
Pre-Mitigation Post-Mitigation	and macro organism Duration 5 4 Degradation of soil	ms. Extent 1 1 resources can be plement soil cons	Magnitude 6 4 remedied in the revation and stock	Probability 5 3 following ways:	Significance 60 27
Pre-Mitigation Post-Mitigation	and macro organism Duration 5 4 Degradation of soil (1) Develop and im	ms. Extent 1 resources can be plement soil consiplement a Rehabi	Magnitude 6 4 remedied in the revation and stock	Probability 5 3 following ways:	Significance 60 27
Pre-Mitigation Post-Mitigation Mitigation Measures:	and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of	ms. Extent 1 resources can be plement soil consplement a Rehabit fertile soil	Magnitude 6 4 remedied in the ervation and stock	Probability 5 3 following ways:	Significance 60 27
Pre-Mitigation Post-Mitigation Mitigation Measures:	and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: U	resources can be plement soil consplement a Rehabite fertile soil	Magnitude 6 4 remedied in the ervation and stock litation plan.	Probability 5 3 following ways: spile management pla	Significance 60 27 an.
Pre-Mitigation Post-Mitigation Mitigation Measures:	and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: U lead to erosion. E	ms. Extent 1 resources can be plement soil consplement a Rehabite fertile soil n-vegetated areas rosion prone areas	Magnitude 6 4 remedied in the revation and stock litation plan. s exposed to weat as have a high ri	Probability 5 3 following ways: spile management pla	Significance 60 27 an. ed period of time will oil caused by flash
Pre-Mitigation Post-Mitigation Mitigation Measures:	and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: U lead to erosion. E	ms. Extent 1 1 resources can be plement soil consplement a Rehabite fertile soil n-vegetated areas rosion prone areas	Magnitude 6 4 remedied in the revation and stock litation plan. s exposed to weat as have a high ri	Probability 5 3 following ways: spile management place thering for an extended sk of losing fertile services.	Significance 60 27 an. ed period of time will oil caused by flash
Pre-Mitigation Post-Mitigation Mitigation Measures: Impact:	and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: U lead to erosion. E floods. The loss of	resources can be plement soil consplement a Rehabit fertile soil n-vegetated areas fertile soil will resulted.	Magnitude 6 4 remedied in the revation and stock litation plan. s exposed to weat as have a high right in the loss of important the second sec	Probability 5 3 following ways: spile management place thering for an extended sk of losing fertile supportant micro ecosys	Significance 60 27 an. ed period of time will oil caused by flash tems.
Pre-Mitigation Post-Mitigation Mitigation Measures: Impact: Significance rating:	and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: U lead to erosion. E floods. The loss of Duration	resources can be plement soil consplement a Rehabiterile soil in-vegetated areas rosion prone area fertile soil will resultation.	Magnitude 6 4 remedied in the revation and stock litation plan. s exposed to weat as have a high riult in the loss of im	Probability 5 3 following ways: spile management place thering for an extended sk of losing fertile supportant micro ecosys Probability	Significance 60 27 an. ed period of time will oil caused by flash tems. Significance



(1) Development and implementation of a storm water management plan.
(2) Regular inspection of erosion prone areas for signs of erosion.
(3) A soil conservation and stockpiling plan to be developed and implemented.
(4) Monthly monitoring of water quality (as per recommendation of specialist study).

Activity:	20.Drilling & Blasting					
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: The	Direct Impact: The use of drill Riggs poses a high risk of hydrocarbon spills. Depending on the				
	size of the spill the	e level of contam	ination may vary	from insignificant to	significant and may	
	affect the surrounding water quality (both surface and sub-surface) as well as the soil quality.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	8	5	65	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contami	nation can be contro	olled in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances	management plan sp	pecifically addressing	
	handling, storage, a	and transport of h	azardous substai	nces.		
	(2) Develop and ir	nplement an eme	ergency response	e procedure address	ing the procedure in	
	case of a chemical	spill. This proced	dure should ensu	re the fastest possible	e reaction to spills or	
	accidents as well a	s addressing remo	ediation procedu	es.		
	(3) Development ar	nd implementation	of an incident re	porting procedure.		
Impact:	Degradation of so	il resources				
	Direct Impact: Imp	proper manageme	ent of blasting act	ivities poses the risk	of contaminating soil	
	resources with poll	utants such as a	high content of	Nitrates. The present	ce of pollutant in the	
	soils results in the	degradation of the	quality.			
	Indirect Impact: T	he degradation of	f soil quality pose	es the risk of degradi	ng the conditions for	
	flora and fauna mic	ro ecosystems.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	8	5	65	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Degradation of soil			•		
	. ,	•		kpile management pl	an.	
	(2) Develop and im	plement a Rehabi	litation plan.			

Activity:	21. RoM & product stockpiling					
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: Th	roughout the ope	rational phase eq	uipment and plant ar	e used to transport	
	and stockpile RoM	and product. Thi	is poses a risk of	hydrocarbon spills if	equipment are not	
	maintained. Deper	nding on the size	e of the spill the	level of contaminat	ion may vary from	
	insignificant to sign	nificant and may a	affect the surround	ling water quality (bo	th surface and sub-	
	surface) as well as	the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	1	8	5	65	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be controlled in the following					
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances r	nanagement plan spe	ecifically addressing	
	handling, storage, a	and transport of h	azardous substand	ces.		
	(2) Develop and ir	mplement an eme	ergency response	procedure addressin	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing reme	adiation procedure	26		
		o addressing ronn	ediation procedure	55.		
	(3) Development ar	•	•			
Impact:	(3) Development an Degradation of so	nd implementation	•			
Impact:	Degradation of so	nd implementation	n of an incident rep		e clearance, topsoil	
Impact:	Degradation of so	nd implementation il resources not managed pro	n of an incident rep	porting procedure.	•	
Impact:	Degradation of so	nd implementation il resources not managed pro illing. Loss of ferti	n of an incident rep	orting procedure.	•	
Impact: Significance rating:	Degradation of so Direct Impact: If r striping and stockp	nd implementation il resources not managed pro illing. Loss of ferti	n of an incident rep	orting procedure.	•	
	Degradation of so Direct Impact: If r striping and stockp and macro organism	nd implementation il resources not managed pro illing. Loss of ferti	perly, fertile soil v	vill be lost during site	bitat for flora micro-	
Significance rating:	Degradation of so Direct Impact: If r striping and stockp and macro organism Duration	nd implementation il resources not managed pro illing. Loss of ferti	perly, fertile soil vile soil will cause t	vill be lost during site the degradation of hal	bitat for flora micro-	
Significance rating: Pre-Mitigation	Degradation of so Direct Impact: If r striping and stockp and macro organism Duration 5	nd implementation il resources not managed pro illing. Loss of ferti ms. Extent 1	perly, fertile soil ville soil will cause to the soil will be soil w	vill be lost during site he degradation of half	bitat for flora micro- Significance 60	
Significance rating: Pre-Mitigation Post-Mitigation	Degradation of so Direct Impact: If r striping and stockp and macro organism Duration 5 4 Degradation of soil	nd implementation il resources not managed pro illing. Loss of ferti ms. Extent 1 1 resources can be	perly, fertile soil vile soil will cause to the soil will be soil will cause to the soil will be soil will	vill be lost during site he degradation of half	Significance 60 27	
Significance rating: Pre-Mitigation Post-Mitigation	Degradation of so Direct Impact: If r striping and stockp and macro organism Duration 5 4 Degradation of soil	nd implementation il resources not managed pro illing. Loss of ferti ms. Extent 1 resources can be plement soil cons	perly, fertile soil vile soil will cause to the soil will be soil will cause to the soil will be soil wi	porting procedure. will be lost during site the degradation of half the degra	Significance 60 27	
Significance rating: Pre-Mitigation Post-Mitigation	Degradation of so Direct Impact: If r striping and stockp and macro organism Duration 5 4 Degradation of soil (1) Develop and im	il resources not managed propiling. Loss of fertims. Extent 1 1 resources can be plement soil consuplement a Rehabi	perly, fertile soil vile soil will cause to the soil will be soil will cause to the soil will be soil wi	porting procedure. will be lost during site the degradation of half the degra	Significance 60 27	
Significance rating: Pre-Mitigation Post-Mitigation Mitigation Measures:	Degradation of so Direct Impact: If restriping and stockpe and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of	nd implementation il resources not managed pro illing. Loss of ferti ms. Extent 1 1 resources can be plement soil cons plement a Rehabi	perly, fertile soil volle soil will cause to the soil will be soi	porting procedure. will be lost during site the degradation of half the degra	Significance 60 27	
Significance rating: Pre-Mitigation Post-Mitigation Mitigation Measures:	Degradation of so Direct Impact: If restriping and stockpe and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: U	nd implementation il resources not managed propiling. Loss of ferti ms. Extent 1 1 resources can be plement soil conseplement a Rehabit fertile soil In-vegetated areas	perly, fertile soil volle soil will cause to the soil will be soil will cause to the soil will be	porting procedure. vill be lost during site the degradation of half the degra	Significance 60 27 n.	
Significance rating: Pre-Mitigation Post-Mitigation Mitigation Measures:	Degradation of so Direct Impact: If restriping and stockpe and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: Unlead to erosion. E	nd implementation ill resources not managed propiling. Loss of fertines. Extent 1 1 resources can be plement soil consuplement a Rehabit fertile soil In-vegetated areas rosion prone areas	perly, fertile soil value soil will cause to the soil will be soil will cause to the soil will be soil	porting procedure. vill be lost during site the degradation of half the degra	Significance 60 27 n. d period of time will oil caused by flash	
Significance rating: Pre-Mitigation Post-Mitigation Mitigation Measures:	Degradation of so Direct Impact: If restriping and stockpe and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: Unlead to erosion. E	nd implementation ill resources not managed propiling. Loss of fertines. Extent 1 1 resources can be plement soil consuplement a Rehabit fertile soil In-vegetated areas rosion prone areas	perly, fertile soil value soil will cause to the soil will be soil will cause to the soil will be soil	porting procedure. will be lost during site the degradation of half the degra	Significance 60 27 n. d period of time will oil caused by flash	
Significance rating: Pre-Mitigation Post-Mitigation Mitigation Measures: Impact:	Degradation of so Direct Impact: If restriping and stockpe and macro organism Duration 5 4 Degradation of soil (1) Develop and im (2) Develop and im Erosion – Loss of Indirect Impact: Ullead to erosion. Elead to erosion. Elead to force of Indirect Impact: Ullead to erosion. Elead to erosion.	nd implementation il resources not managed pro illing. Loss of ferti ms. Extent 1 1 resources can be plement soil cons plement a Rehabi fertile soil In-vegetated areas fertile soil will reso	perly, fertile soil value soil will cause to the soil will be soil	porting procedure. vill be lost during site the degradation of half the degra	Significance 60 27 n. d period of time will oil caused by flash tems.	



Mitigation Measures:	Erosion can be <i>controlled</i> in the following ways:						
	(1) Development and implementation of a storm water management plan.						
	(2) Regular inspection of erosion prone areas for signs of erosion.						
	(3) A soil conservation and stockpiling plan to be developed and implemented.						
	(4) Monthly monitoring of water quality (as per recommendation of specialist study).						

Activity:	22. Residue stockp	22. Residue stockpiles							
Impact:	Degradation of so	Degradation of soil resources							
	Direct Impact: If I	Direct Impact: If not managed properly, fertile soil will be lost during site clearance, topsoil							
	striping and stockp	iling. Loss of fert	tile soil will cause	the degradation of ha	bitat for flora micro-				
	and macro organis	and macro organisms.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	5	1	8	5	70				
Post-Mitigation	4	1	4	3	27				
Mitigation Measures:	Degradation of soil	Degradation of soil resources can be <i>remedied</i> in the following ways:							
	(1) Develop and implement soil conservation and stockpile management plan.								
	(2) Develop and im	plement a Rehat	oilitation plan.						

Activity:	23. Screening Operations						
Impact:	Hydrocarbon Contamination						
	Direct Impact: Hy	drocarbon spills	can occur where	heavy machinery suc	ch as the screening		
	plant and hauling	vehicles are parke	ed because they	contain large volume	s of lubricating oils,		
	hydraulic oils, and	diesel to run. Th	nis poses a risk o	of hydrocarbon spills	if equipment is not		
	maintained. Deper	nding on the size	e of the spill the	level of contaminat	ion may vary from		
	insignificant to sigr	nificant and may a	affect the surround	ling water quality (bo	th surface and sub-		
	surface) as well as the soil quality.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	1	8	5	65		
Post-Mitigation	4	1	2	3	21		
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>contro</i>	Iled in the following		
	ways:						
	(1) Develop and im	nplement a Hazaro	dous substances r	management plan spe	ecifically addressing		
	handling, storage, a	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	mplement an eme	ergency response	procedure addressir	ng the procedure in		
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or		



	accidents as well a	accidents as well as addressing remediation procedures.							
	(3) Development a	(3) Development and implementation of an incident reporting procedure.							
Impact:	Degradation of so	Degradation of soil resources							
	Direct Impact: Im	Direct Impact: Improper management of stockpile area i.e. mixing of topsoil and fertile soils							
	with subsoil or Roll	I product poses	a risk of degrading	g of soil quality.					
	Indirect Impact: T	Indirect Impact: The degradation of soil quality poses the risk of degrading the conditions for							
	flora micro organis	flora micro organism to thrive.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	5	1	8	5	70				
Post-Mitigation	4	1	4	3	27				
Mitigation Measures:	Degradation of soil	Degradation of soil resources can be <i>remedied</i> in the following ways:							
	(1) Develop and im	(1) Develop and implement soil conservation and stockpile management plan.							
	(2) Develop and im	plement a Reha	abilitation plan.						

Activity:	24. Discard disposa	al (backfilling of m	ining area)					
Impact:	Hydrocarbon Contamination							
	Direct Impact: Du	Direct Impact: During backfilling activities equipment and plant are used. This poses a risk of						
	hydrocarbon spills	if equipment is no	t maintained. Dep	ending on the size of	the spill the level of			
	contamination may	vary from insigni	ificant to significa	nt and may affect the	e surrounding water			
	quality (both surfac	e and sub-surface	e) as well as the s	oil quality.				
	Indirect Impact: T	he degradation o	of water quality ar	nd soil quality poses	a risk of negatively			
	affecting the condit	ions for micro and	l macro organism	s to thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	5	2	6	5	65			
Post-Mitigation	3	1	4	3	27			
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamir	nation can be <i>control</i>	Iled in the following			
	ways:							
	(1) Develop and im	plement a Hazaro	dous substances	management plan spe	ecifically addressing			
	handling, storage, a	and transport of ha	azardous substan	ces.				
	(2) Develop and ir	nplement an eme	ergency response	procedure addressir	ng the procedure in			
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or			
	accidents as well a	s addressing reme	ediation procedure	es.				
	(3) Development ar	(3) Development and implementation of an incident reporting procedure.						
Impact:	Degradation of so	il resources						
	Direct Impact: Ba	ckfilling of soil lay	ers will impact or	the land capability b	y restoring the land			

	capability to some	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. However if not done							
	incorrectly, the con	ditions for fauna a	and flora to reinsta	ate the area will be ne	gatively affected.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	5	1	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:				
	(1) Develop and im	plement soil cons	ervation and stoo	kpile management pla	an.			
	(2) Develop and im	plement a Rehab	ilitation plan.					
Impact:	Erosion – Loss of	Erosion – Loss of fertile soil						
	Indirect Impact: U	Indirect Impact: Un-vegetated areas exposed to weathering for an extended period of time will						
	lead to erosion. E	rosion prone are	as have a high	risk of losing fertile s	oil caused by flash			
	floods. The loss of	fertile soil will res	ult in the loss of ir	mportant micro ecosys	tems.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	8	5	70			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Erosion can be cor	ntrolled in the foll	owing ways:	-				
	(1) Development a	nd implementatior	n of a storm water	management plan.				
	(2) Regular inspect	(2) Regular inspection of erosion prone areas for signs of erosion.						
	(3) A soil conservat	tion and stockpilin	g plan to be deve	eloped and implemente	ed.			
	(4) Monthly monitor	ring of water quali	ty (as per recomr	nendation of specialis	t study).			

Activity:	25. Waste generation, storage and disposal								
Impact:	Degradation of soil resources								
	Direct Impact: Th	e storage of large	e amounts of was	te over an extended	time in a area not				
	lined or bunde	lined or bunded poses a risk of forming potentially hazardous leachates.							
	Indirect Impact: Th	ne hazardous lea	chate potentially	poses a risk in con	taminating the soil				
	causing the degradation of conditions for flora micro organisms to thrive.								
Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	4	1	6	5	55				
Post-Mitigation	4	1	2	3	21				
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:					
	(1) Develop and implement soil conservation and stockpile management plan.								
	(2) Develop and implement a Rehabilitation plan.								
Impact:	Illegal dumping								

Dι	ıratio	n	Ex	tent		Magi	nitude		Prob	abilit	y	S	ignificar	псе
the	the degradation of conditions for the aquatic ecology to thrive.													
со	contaminating both surface and sub-surface water as well as soil resources. This may lead to													
Inc	direc	t Impact	:: The	hazardo	us le	achate	from	the	waste	stora	ge faci	ilities	poses a	a risk of
ille	gal	dumps	also	poses	а	risk	to th	ne	health	of	surrou	ınding	g comr	nunities.
du	dumping of general waste poses a choking risk to grazing animals. Hazardous Leachates from													
au	authorisation or EMP poses a high risk of polluting numerous sources i.e. Water and soil. The													
Ind	direc	t Impact	t: Dun	nping of	gen	erated	wate	r in	areas	othe	than	is a	pproved	by the

Significance rating:	Duration	Extent	Magnitude	Probability	Significance				
Pre-Mitigation	5	2	8	5	75				
Post-Mitigation	4	1	4	3	27				
Mitigation Measures:	Illegal dumping car	Illegal dumping can be avoided in the following ways:							
	(1) Develop and i	mplement as wa	ste management	plan with the focus	on reuse, reduce,				
	recycle, or avoid.								
	(2) Development a	nd maintenance o	f a waste disposal	record keeping syste	em.				

Activity:	25. Waste generation, storage and disposal							
Impact:	Degradation of so	il resources						
	Direct Impact: Co	Direct Impact: Continuous leaking, spills or lack of maintenance poses a risk to contaminating						
	the surrounding so	ils and degrading	the soil quality.	This will affect the mi	cro-ecosystems in a			
	negative manner.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	1	1	6	5	40			
Post-Mitigation	1	1	4	3	18			
Mitigation Measures:	Degradation of soil resources can be <i>remedied</i> in the following ways:							
	(1) Develop and implement soil conservation and stockpile management plan.							
	(2) Develop and im	plement a Rehab	ilitation plan.					



Activity:	27. River crossings	27. River crossings						
Impact:	Hydrocarbon Contamination							
	Direct Impact: Throughout the construction and operational phase construction equipment are							
	used. This poses a	a risk of hydrocar	oon spills if equip	ment are not maintai	ned. Depending on			
	the size of the spill	the level of conta	mination may vary	r from insignificant to	significant and may			
	affect the surround	ing water quality (ooth surface and s	sub-surface) as well a	s the soil quality.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	3	2	8	5	65			
Post-Mitigation	2	1	6	3	27			
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	led in the following			
	ways:							
	(1) Develop and im	iplement a Hazaro	lous substances r	nanagement plan spe	ecifically addressing			
	handling, storage, a	and transport of ha	azardous substand	ces.				
	(2) Develop and ir	mplement an eme	rgency response	procedure addressin	g the procedure in			
	case of a chemical	spill. This proced	lure should ensur	e the fastest possible	reaction to spills or			
	accidents as well a	s addressing reme	ediation procedure	es.				
	(3) Development ar	nd implementation	of an incident rep	orting procedure.				
Impact:	Erosion – Loss of	fertile soil						
	Indirect Impact:	Improper installa	tion of river cro	ssing infrastructure	poses the risk of			
	contributing to the	conditions causing	g erosion i.e. Un-v	regetated and expose	ed river/watercourse			
	banks.							
	Indirect Impact:	Erosion poses a	risk of contribu	iting to sedimentation	on and siltation of			
	rivers/watercourses	s. Pollutants may a	affect the condition	ns for the aquatic ecol	logy to thrive.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	1	8	5	65			
Post-Mitigation	4	1	4	4	36			
Mitigation Measures:	Erosion can be <i>cor</i>	ntrolled in the follo	owing ways:					
	(1) Development ar	nd implementation	of a storm water	management plan.				
	(2) Regular inspect	ion of erosion pro	ne areas for signs	of erosion.				
	(3) A soil conservat	tion and stockpilin	g plan to be devel	oped and implemente	ed.			
	(4) Monthly monitor	ring of water quali	ty (as per recomm	endation of specialist	study).			

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

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Activity:	29. Storage of fuel and lubricants in temporary				
Impact:	Hydrocarbon Contamination				
	Direct Impact: The construction of improper storage facilities poses a risk of the surrou				
	environment to b	e exposes to	continuous leaki	ng of hydrocarbons	s leading possibly
	contaminating surf	ace and sub-surf	ace water source	es as well as the so	oils surrounding the
	facility.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	1	8	5	70
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following ways: (1) Develop and implement a Hazardous substances management plan specifically addressing handling, storage, and transport of hazardous substances. (2) Develop and implement an emergency response procedure addressing the procedure in				
					ecifically addressing
					ng the procedure in
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills accidents as well as addressing remediation procedures.				
	(3) Development and implementation of an incident reporting procedure. Degradation of soil resources				
Impact:					
	Direct Impact: Co	ntinuous exposur	e to hydrocarbon	leaks poses a risk to	the degradation of
	the surrounding soi	the surrounding soil resources.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	1	8	5	55
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:	
	(1) Develop and im	plement soil cons	ervation and stocl	kpile management pla	an.
	(2) Develop and implement a Rehabilitation plan.				

Activity:	30. Vehicular activity on haul roads; and operation of mining equipment				
Impact:	Hydrocarbon Contamination				
	Direct Impact: The use of vehicles on haul roads throughout the operational phase poses a				
	risk of hydrocarbon spills if equipment is not maintained. Depending on the size of the spill the				
	level of contamination may vary from insignificant to significant and may affect the surrounding				
	water quality (both surface and sub-surface) as well as the soil quality.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	1	8	5	70



Post-Mitigation	4	1	4	3	27			
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following ways:						
	ways:							
	(1) Develop and implement a Hazardous substances management plan specifically addressing							
	handling, storage, a	handling, storage, and transport of hazardous substances. (2) Develop and implement an emergency response procedure addressing the procedure in						
	(2) Develop and ir							
	case of a chemical	spill. This proced	dure should ensure	e the fastest possible	reaction to spills or			
	accidents as well a	s addressing reme	ediation procedure	es.				
	(3) Development ar	nd implementation	of an incident rep	oorting procedure.				
Impact:	Erosion – Loss of	fertile soil						
	Indirect Impact: In	mproper managen	nent of storm wate	er may lead to erosic	n along the access			
	routes. This may le	ad to the loss of f	ertile soil and in it	s turn affect the micro	o-ecosystems of the			
	surrounding enviror	surrounding environment.						
Significance rating:	Duration	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	4	1	8	5	65			
Post-Mitigation	4	1	6	3	33			
Mitigation Measures:	Erosion can be <i>controlled</i> in the following ways: (1) Development and implementation of a storm water management plan. (2) Regular inspection of erosion prone areas for signs of erosion. (3) A soil conservation and stockpiling plan to be developed and implemented.							
	(4) Monthly monitoring of water quality (as per recommendation of specialist study).							
Impact:	Degradation of so							
	Direct Impact: As part of the maintenance related to roads, valuable topsoil's may be removed. Improper management of topsoil or fertile soil may cause the loss of flora micro-							
	ecosystems and cause the degradation of soil quality.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	5	1	8	5	70			
Post-Mitigation	4	1	6	2	22			
Mitigation Measures:	Degradation of soil			3 ,				
		•		pile management pla	n.			
	(2) Develop and im	plement a Rehabi	litation plan.					

Activity:	32. Water Management						
Impact:	Erosion – Loss of fertile soil						
	Indirect Impact: Poor management of storm water throughout the construction, operational, and decommissioning phase poses a high risk for erosion. This may lead to the loss of fertile soil and in its turn affect the micro-ecosystems of the surrounding environment.						
Significance rating:	Duration	Ouration Extent Magnitude Probability Significance					
Pre-Mitigation	4	4 1 8 5 65					
Post-Mitigation	4	1	4	3	27		
Mitigation Measures:	Erosion can be <i>controlled</i> in the following ways:						
	(1) Development and implementation of a storm water management plan.						
	(2) Regular inspection of erosion prone areas for signs of erosion.						
	(3) A soil conservation and stockpiling plan to be developed and implemented.			ed.			
	(4) Monthly monitoring of water quality (as per recommendation of specialist study).						

Activity:	33. Rehabilitation of mining areas					
Impact:	Erosion – Loss of fertile soil					
	Indirect Impact: E	Indirect Impact: Exposed un-vegetated rehabilitated areas pose a high risk of erosion. This				
	may lead to the los	s of fertile soil an	d in its turn affect	t the micro-ecosystems	s of the surrounding	
	environment.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	1	8	5	70	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Erosion can be <i>controlled</i> in the following ways:					
	(1) Development and implementation of a storm water management plan.					
	(2) Regular inspection of erosion prone areas for signs of erosion.					
	(3) A soil conservation and stockpiling plan to be developed and implemented.					
	(4) Monthly monitoring of water quality (as per recommendation of specialist study).					
Impact:	Degradation of soil resources					
	Direct Impact: Poor management of topsoil and subsoil poses a risk to degradation of soil					
	resources.					
Significance rating:	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	5	1	10	5	80	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:		
	(1) Develop and implement soil conservation and stockpile management plan.			n.		

Aspect:

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

Terrestrial Ecosystems

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(2) Develop and implement a Rehabilitation plan.

/ topeot:			1011000	nui E000yoteinio		
	Activity:	18.Topsoil and subsoil stripping & stockpiling for mining operation area				
	Impact:	11 0 1 0 1				
	·	Direct Impact: Cle	earing of site and	d stripping of tops	soil leads to the loss	s of vegetation and
		Direct Impact: Clearing of site and stripping of topsoil leads to the loss of vegetation and habitats of macro and micro organisms Loss of vegetation, increase in runoff and erosion,				
		possible distribution and increased establishment of alien invasive species, possible				
		-			to terrestrial fauna,	•
					rated erosion, possibl	
			• .	•	otential of soil surfac	•
				• .	possible exposure of	
		contaminants – esp				
Significa	ance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigat	tion	5	2	10	5	85
Post-Mitiga	ation	4	1	6	5	55
Mitigation	Measures:	The loss of vegetation can be <i>remedied</i> in the following ways:				
		(1) Development and implementation of a rehabilitation plan.				
		(2) Develop and implement a plant species search and rescue management plan.				
	Impact:	Influx of alien invasive vegetation				
		Direct Impact: Site clearing for roads, lay down areas, and mining area exposes the un-				
		vegetated area to the influx of alien invasive vegetation causing Irreversible damage to the				
		native fauna and flora species and loss of habitats.				
Significa	ance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigat	tion	4	2	6	5	60
Post-Mitiga	ation	4	1	4	4	36
Mitigation	n Measures:	The influx of alien invasive vegetation can be <i>controlled</i> in the following ways:				
		(1) Development and implementation of an alien and invasive control plan.				
		(2) Awareness training on the identification of weeds and alien species to employees				cies to employees
		responsible for the	management of the	nese species.		

Activity:	19.Opencast mining excavations
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Impact:	Vegetation and ha	bitat loss			
	Direct Impact: Cle	earing of site and	d stripping of top	soil leads to the loss	s of vegetation and
	habitats of macro	and micro organi	isms Loss of veg	getation, increase in	runoff and erosion,
	possible distribution	on and increase	ed establishment	of alien invasive	species, possible
	disturbance and re	eduction of habita	t, injury or death	to terrestrial fauna,	possible change of
	natural runoff and	drainage patterns	s causing acceler	rated erosion, possibl	le loss of protected
	species, possible ¡	permanent loss o	f re-vegetation po	otential of soil surfac	e, increase in dust
	levels, interference	with fauna beha	vioural activities,	possible exposure of	f fauna and flora to
	contaminants – esp	ecially hydrocarb	ons and increased	d dust levels.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	10	5	85
Post-Mitigation	4	1	6	5	55
Mitigation Measures:	The loss of vegetat	ion can be <i>remed</i>	lied in the followin	g ways:	
	(1) Development ar	nd implementation	of a rehabilitation	n plan.	
	(2) Develop and im	plement a plant sp	pecies search and	I rescue management	plan.
Impact:	Influx of alien inva	asive vegetation			
	Direct Impact: Sit	te clearing for roa	ads, lay down ar	reas, and mining are	ea exposes the un-
	vegetated area to	the influx of alier	n invasive vegeta	tion causing Irrevers	ible damage to the
	native fauna and flo	ora species and lo	ss of habitats.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	2	6	5	60
Post-Mitigation	4	1	4	4	36
Mitigation Measures:	The influx of alien i	nvasive vegetation	n can be <i>controll</i>	ed in the following wa	ys:
	(1) Development and implementation of an alien and invasive control plan.				
	(2) Awareness tra	aining on the ide	entification of we	eeds and alien spe	cies to employees
	responsible for the	management of th	nese species.		

Activity:	21. RoM & product stockpiling
Impact:	Vegetation and habitat loss
	Direct Impact: Clearing of site and stripping of topsoil leads to the loss of vegetation and
	habitats of macro and micro organisms Loss of vegetation, increase in runoff and erosion,
	possible distribution and increased establishment of alien invasive species, possible
	disturbance and reduction of habitat, injury or death to terrestrial fauna, possible change of
	natural runoff and drainage patterns causing accelerated erosion, possible loss of protected
	species, possible permanent loss of re-vegetation potential of soil surface, increase in dust

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	levels, interference with fauna behavioural activities, possible exposure of fauna and flora to						
	contaminants – esp	contaminants – especially hydrocarbons and increased dust levels.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	5	1	8	5	70		
Post-Mitigation	4	1	6	5	55		
Mitigation Measures:	The loss of vegetat	ion can be <i>remed</i>	lied in the followir	ng ways:			
	(1) Development ar	nd implementatior	n of a rehabilitation	n plan.			
	(2) Develop and im	plement a plant s	pecies search and	d rescue management	plan.		
Impact:	Influx of alien invasive vegetation						
	Direct Impact: Sit	Direct Impact: Site clearing for roads, lay down areas, and mining area exposes the un-					
	vegetated area to	the influx of alie	n invasive vegeta	ation causing Irrevers	ible damage to the		
	native fauna and flo	native fauna and flora species and loss of habitats.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	4	2	6	5	60		
Post-Mitigation	4	1	4	4	36		
Mitigation Measures:	The influx of alien i	nvasive vegetatio	n can be <i>controll</i>	ed in the following wa	ys:		
	(1) Development and implementation of an alien and invasive control plan.						
	(2) Awareness tra	(2) Awareness training on the identification of weeds and alien species to employees					
	responsible for the	management of t	hese species.	esponsible for the management of these species.			

Activity:	22. Residue stockp	iles					
Impact:	Vegetation and ha	Vegetation and habitat loss					
	Direct Impact: Cle	Direct Impact: Clearing of site and stripping of topsoil leads to the loss of vegetation and					
	habitats of macro	and micro orga	nisms Loss of ve	egetation, increase in	runoff and erosion,		
	possible distribution	on and increas	sed establishme	nt of alien invasive	species, possible		
	disturbance and re	eduction of habit	at, injury or deat	h to terrestrial fauna,	possible change of		
	natural runoff and	drainage patter	ns causing accele	erated erosion, possib	le loss of protected		
	species, possible ¡	species, possible permanent loss of re-vegetation potential of soil surface, increase in dust					
	levels, interference with fauna behavioural activities, possible exposure of fauna and flora to						
	contaminants – especially hydrocarbons and increased dust levels.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	5	1	8	5	70		
Post-Mitigation	4	4 1 6 5 55					
Mitigation Measures:	The loss of vegetation can be <i>remedied</i> in the following ways:						
	(1) Development ar	nd implementation	on of a rehabilitation	on plan.			

(2) Develop and implement a plant species search and rescue management plan.

Activity	: 33. Rehabilitation of	of mining areas				
Impact	Vegetation and ha	abitat loss				
	Direct Impact: Im	proper rehabilitation	on measures impl	emented poses a ris	k of vegetation and	
	habitat loss. The	conditions for	macro and micro	o organisms need	to be suitable for	
	reinstatement of the	einstatement of the ecosystem. Loss of vegetation, increase in runoff and erosion, possible				
	distribution and in	creased establish	ment of alien inva	asive species, possib	le disturbance and	
	reduction of habita	t, injury or death	to terrestrial faun	a, possible change o	f natural runoff and	
	drainage patterns	causing accelera	ted erosion, poss	ible loss of protected	d species, possible	
	permanent loss of	re-vegetation pot	ential of soil surfa	ice, increase in dust	levels, interference	
	with fauna behavi	oural activities, p	ossible exposure	of fauna and flora	to contaminants -	
	especially hydrocal	rbons and increas	ed dust levels.			
Significance rating	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	1	10	5	80	
Post-Mitigation	1	1	6	4	32	
Mitigation Measures	The loss of vegetat	ion can be reme a	lied in the followin	g ways:		
	(1) Development a	nd implementatior	of a rehabilitation	plan.		
	(2) Develop and im	plement a plant s	pecies search and	rescue management	plan.	
Impact	Influx of alien inva	asive vegetation				
	Direct Impact: Si	te clearing for ro	ads, lay down ar	eas, and mining are	a exposes the un-	
	vegetated area to	the influx of alie	n invasive vegeta	tion causing Irrevers	ible damage to the	
	native fauna and flo	ora species and lo	ss of habitats.			
Significance rating	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	1	1	4	4	24	
Mitigation Measures	The influx of alien i	nvasive vegetation	n can be <i>controlle</i>	ed in the following way	ys:	
	(1) Development a	(1) Development and implementation of an alien and invasive control plan.				
	(2) Awareness training on the identification of weeds and alien species to employees					
	responsible for the	management of the	nese species.			
Aspect:		N.	ise Quality			

Activity:	18.Topsoil and subsoil stripping & stockpiling for mining operation area
Impact:	Noise Generation
	Direct Impact: 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.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	4	1	6	5	55
Post-Mitigation	4	1	4	3	27
Mitigation Measures:	. ,	and implementation 6. A monitoring (Appendix F). orting, and remedical	on of an Acousti program to b	cal Measurement & A ne developed based	Ğ

Activity:	19.Opencast mining	19.Opencast mining excavations				
Impact:	Noise Generation	Noise Generation				
	Direct Impact: Th	e use of constru	ction equipment	during site clearing a	nd topsoil stripping	
	may cause noise d	uring the constru	ction phase. If eq	uipment are not main	tained and serviced	
	regularly high levels	s of noise may res	sult throughout the	e construction and ope	erational phase.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Noise generation ca	an be controlled	in the following w	ays:		
	(1) Development a	ind implementation	n of an Acoustic	al Measurement & A	udit Programme as	
	part of the EMS	S. A monitoring	program to be	e developed based	on the specialist	
	recommendations (Appendix F).					
	(2) Recording, reporting, and remediating incidents related to noise.					
	(3) Regular inspect	(3) Regular inspections of vehicles/equipment/plant.				

Activity:	20.Drilling & Blasting
Impact:	Noise Generation
	Direct Impact: The use of drill Riggs and blasting activities itself will result in the generation of
	noise. If equipment is not maintained and serviced regularly high levels of noise may result
	throughout the operational phase.



Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	4	2	6	5	60	
Post-Mitigation	4	2	4	3	30	
Mitigation Measures:	Noise generation ca	an be controlled	in the following w	ays:		
	(1) Development a	(1) Development and implementation of an Acoustical Measurement & Audit Programme as				
	part of the EMS	part of the EMS. A monitoring program to be developed based on the specialist				
	recommendations (Appendix F).					
	(2) Recording, reporting, and remediating incidents related to noise.					
	(3) Regular inspections of vehicles/equipment/plant.					

Noise Generation	Noise Generation			
Direct Impact: The	e use of construct	tion equipment du	uring the hauling and	stockpiling of RoM
and product may c	ause noise durinç	g the operational	phase. If equipment	are not maintained
and serviced regu	larly high levels	of noise may r	result throughout the	e construction and
operational phase.				
Duration	Extent	Magnitude	Probability	Significance
4	2	4	5	50
4	1	2	3	21
Noise generation ca	an be controlled i	in the following wa	ays:	
(1) Development and implementation of an Acoustical Measurement & Audit Programme as				
part of the EMS	. A monitoring	program to be	developed based	on the specialist
recommendations (Appendix F).				
(2) Recording, reporting, and remediating incidents related to noise.				
(3) Regular inspections of vehicles/equipment/plant.				
. , .				
[Direct Impact: The and product may contain and serviced regular operational phase. Duration 4 4 Noise generation can and phase and a serviced regular and phase. Duration 4 2) Recording, repo	Direct Impact: The use of construct and product may cause noise during and serviced regularly high levels operational phase. Duration Extent 4 2 4 1 Noise generation can be controlled and implementation part of the EMS. A monitoring recommendations (Appendix F). 2) Recording, reporting, and remediates	Direct Impact: The use of construction equipment during the operational and product may cause noise during the operational and serviced regularly high levels of noise may reperational phase. Duration Extent Magnitude 4 2 4 4 1 2 Noise generation can be controlled in the following was a serviced and implementation of an Acoustical part of the EMS. A monitoring program to be recommendations (Appendix F). 2) Recording, reporting, and remediating incidents relations.	Direct Impact: The use of construction equipment during the hauling and and product may cause noise during the operational phase. If equipment and serviced regularly high levels of noise may result throughout the operational phase. Duration Extent Magnitude Probability 4 2 4 5 4 1 2 3 Noise generation can be controlled in the following ways: 1) Development and implementation of an Acoustical Measurement & Alexart of the EMS. A monitoring program to be developed based recommendations (Appendix F). 2) Recording, reporting, and remediating incidents related to noise.

Activity:	23. Screening Operations				
Impact:	Noise Generation				
	Direct Impact: Operation of the screening plant poses a risk of increasing the ambient noise				
	levels at surrounding sensitive receptors.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance



Pre-Mitigation	4	1	6	5	55	
Post-Mitigation	4	1	4	3	27	
Mitigation Measures:	Noise generation ca	an be controlled i	in the following wa	ays:		
	(1) Development a	nd implementatio	n of an Acoustica	al Measurement & A	udit Programme as	
	part of the EMS	part of the EMS. A monitoring program to be developed based on the specialist				
	recommendations (recommendations (Appendix F).				
	(2) Recording, repo	orting, and remedia	ating incidents rela	ated to noise.		
	(3) Regular inspect	ions of vehicles/ed	quipment/plant.			

Activity:	23. Screening Operations				
Impact:	Noise Generation				
	Direct Impact: The	e use of construc	ction equipment of	during backfilling may	cause noise during
	the construction ph	nase. If equipmen	t are not maintai	ned and serviced reg	ularly high levels of
	noise may result the	roughout the oper	rational phase.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	2	6	5	55
Post-Mitigation	1	1	4	3	18
Mitigation Measures:	Noise generation ca	Noise generation can be <i>controlled</i> in the following ways:			
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist				
					on the specialist
	recommendations (Appendix F).				
	(2) Recording, reporting, and remediating incidents related to noise.				
	(3) Regular inspections of vehicles/equipment/plant.				
	, ,				

Activity:	30. Vehicular activi	30. Vehicular activity on haul roads; and operation of mining equipment				
Impact:	Noise Generation	Noise Generation				
	Direct Impact: The	e use of constr	uction equipment	during backfilling may	cause noise during	
	the construction ph	the construction phase. If equipment are not maintained and serviced regularly high levels of				
	noise may result th	noise may result throughout the operational phase.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	4	4 2 6 5 60				
Post-Mitigation	4	4 1 4 3 27				
Mitigation Measures:	Noise generation can be <i>controlled</i> in the following ways:					



- (1) Development and implementation of an Acoustical Measurement & Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (**Appendix F**).
- (2) Recording, reporting, and remediating incidents related to noise.
- (3) Regular inspections of vehicles/equipment/plant.

Activity:	33. Rehabilitation of mining areas						
Impact:	Noise Generation	Noise Generation					
	Direct Impact: Th	e use of unmain	ntained equipme	nt and plant througho	out the rehabilitation		
	phase poses a risk	of generating no	ise.				
Significance rating:	Duration	uration Extent Magnitude Probability Significance					
Pre-Mitigation	2	2	6	5	50		
Post-Mitigation	1	1	4	3	18		
Mitigation Measures:	Noise generation ca	Noise generation can be <i>controlled</i> in the following ways:					
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as						
	part of the EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F). (2) Recording, reporting, and remediating incidents related to noise.						
	(3) Regular inspect	ions of vehicles/e	equipment/plant.				



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Aspect:	Socio-economic

Activity:	14. Employment of	14. Employment of workers and procurement of construction materials						
Impact:	Loss of farm labour							
	Direct Impact: Increased demand of labour force poses a risk of the local farmers losing farm							
	labour due to comp	eting financial inc	come.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	4	5	50			
Post-Mitigation	4	2	2	4	32			
Impact:	Population Influx	- Pressure on Ro	esources					
	Direct Impact: Inc	creased demand	for labour force	poses a risk of a pop	ulation influx in the			
	local district munici	pality. The increas	sing population w	ill put pressure on the	local municipality to			
	provide services su	ıch as sewage, dr	inking water, was	te management, elect	ricity etc.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	4	5	50			
Post-Mitigation	4	2	2	4	32			
Impact:	Population Influx	- Social Patholo	gies	•				
	Direct Impact: Inc	creased demand	for labour force	poses a risk of a po	pulation influx. The			
	increased population	on influx may lea	d to conflicting so	ocial pathologies in th	e surrounding local			
	community.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	4	5	50			
Post-Mitigation	4	2	2	4	32			
Impact:	Job Creation and	Skills Training						
	_	•	•	orce will form part of	-			
			osed mining ope	ration will create a jo	b opportunity for at			
	least a total of 60 p							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	4	2	0	4	24			
Post-Mitigation	4	2	0	4	24			
Impact:	Job Creation (Mul	•	-					
	-		•	posed mining project v	Direct Impact: Social projects forming part of the proposed mining project will create additional			
	job opportunities for the local communities.							
	*	1	•					
Significance rating: Pre-Mitigation	Duration	Extent 3	Magnitude 0	Probability 5	Significance			



Post-Mitigation	4	2	0	4	24
Mitigation Measures:	The social-econom	ic impacts can be	controlled in the	following ways:	
	(1) Develop and im	plement a social la	abour plan.		
	(2) Develop and im	plement a social o	levelopment plan.		
	(3) Develop and im	plement a skills de	evelopment progra	am.	

Aspect:	Heritage and cultural resources
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Activity:	2. Site clearing and	2. Site clearing and topsoil stripping for lay down				
Impact:	Destruction of gra	Destruction of graves				
	Direct Impact: Pr	Direct Impact: Proposed activities in close proximity to identified graves poses the risk of				
	destructing graves	of great cultural a	nd heritage impo	tance.		
	Indirect Impact:	Loss of heritage	and history for	the future generati	ion of the affected	
	community.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	6	5	65	
Post-Mitigation	5	2	6	3	39	
Mitigation Measures:	The destruction of	graves can be <i>avo</i>	bided in the follow	ving ways:		
	(1) Develop and i	mplement an aw	areness campai	gn on the protectior	n of social heritage	
	impacts.					
	(2) Clear marking of	(2) Clear marking of graves discovered by the Heritage Impact Assessment Report (Appendix				
	O)	O)				
Impact:	Degradation of cu	Itural significand	e heritage sites			
	Direct Impact: Pro	posed mining acti	vities in close pro	eximity to cultural sign	ificant heritage sites	
	pose the risk of deg	grading or loss of	these sites.			
	Indirect Impact:	Loss of heritage	and history for	the future generati	ion of the affected	
	community.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	2	6	5	65	
Post-Mitigation	5	2	6	3	39	
Mitigation Measures:	The degradation of	cultural significan	t heritage sites ca	an be avoided in the	following ways:	
	(1) Develop and i	mplement an aw	areness campai	gn on the protectior	n of social heritage	
	impacts.					
	(2) Clear marking	of identified herita	age sites discove	ered by the Heritage	Impact Assessment	
	Report (Appendix	O)				



	Decommissioning
Aspect:	Air Quality

Activity:	35. Demolition / removal of portable and related infrastructure					
Impact:	Dust Generation					
	Direct Impact: Dismantling and demolition of existing infrastructure, transporting and handling					
	of topsoil on unpay	ved roads in order	to bring the site	to state suitable for a	alternative land uses	
	poses potential ir	npacts on the at	tmospheric envir	onment. Demolition	and removal of all	
	infrastructures will	cause fugitive d	ust emissions. A	Any implication this a	activity will have on	
	ambient air quality	will be short-term	and localised.			
	Indirect Impact: (Continuous expos	ure to high leve	els of dust fallout ma	y lead to unhealthy	
	environment for en	nployees and surro	ounding commun	ities.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	1	2	6	5	45	
Post-Mitigation	1	1	4	4	24	
Mitigation Measures:	Fugitive dust generation can be <i>controlled</i> in the following ways:					
	(1) Development of	f a dust fallout mo	nitoring and man	agement plan;		
	(2) Frequent Inspe	ctions; and				
	(3) Reporting and r	recording incidents	s related to air qu	ality.		
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). T					
	recommendations	are included in F	Part B of this re	port. One of the rec	ommendations is to	
	develop a detailed	air quality manag	ement plan (foo	susing on sources of o	dust located in close	
	proximity to the r	esidential recepto	ors within the p	roject boundary) ens	uring adherence to	
	thresholds stipula	ted in the Base	eline Air Quality	Impact Assessmer	it report (BAQIAR)	
	(Appendix E) prior	r to the commence	ement of operatio	ns.		
	There are also a no	umber of legislativ	e requirements s	tipulated in the followi	ng regulations:	
	GN R. 283: National reporting regulations;					
	• GN R. 12	10: National Ambie	ent Air quality sta	ndards; and		
	GN R. 897: National dust control regulations.					

Activity:	36. Vehicular activity: removal of mobile plant / equipment and vehicles
Impact:	Dust Generation
	Direct Impact: 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

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	demolition ceases.						
	Indirect Impact: (Continuous expos	ure to high leve	ls of dust fallout ma	ay lead to unhealth		
	environment for en	nployees and surro	ounding communi	ities.			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	2	6	5	45		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	Fugitive dust gene	Fugitive dust generation can be <i>controlled</i> in the following ways:					
	(1) Development of a dust fallout monitoring and management plan;						
	(2) Frequent Inspe	ctions; and					
	(3) Reporting and r	ecording incidents	s related to air qu	ality.			
	A number of recon	nmendation result	ed from the Air C	Quality Assessment (Appendix E). These		
	recommendations	are included in F	Part B of this re	port. One of the red	commendations is to		
	develop a detailed	air quality manag	ement plan (foc	using on sources of	dust located in close		
	proximity to the r	esidential recepto	ors within the pr	roject boundary) en	suring adherence to		
	thresholds stipula	thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAF					
	(Appendix E) prior to the commencement of operations.						
	There are also a nu	umber of legislativ	e requirements st	tipulated in the follow	ing regulations:		
	• GN R. 283	GN R. 283: National reporting regulations;					
	• GN R. 12	10: National Ambi	ent Air quality sta	ndards; and			
	• GN R. 89	7: National dust co	ontrol regulations.				
Impact:	CO ₂ emissions						
	Direct Impact: Th	e use of diesel of	perated construc	ction equipment will	cause a contributing		
	factor the BCR Min	erals (Pty) Ltd car	bon footprint.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	6	5	40		
Post-Mitigation	1	1	2	3	12		
Mitigation Measures:	CO₂ emissions and	the release of no	xious gasses car	be <i>controlled</i> in the	e following ways:		
	(1) Develop and ma	aintain a carbon fo	ootprint reporting	policy;			
	(2) Monitor the carl	oon footprint throu	ghout the entire I	ife cycle of the Spitsv	vale project;		
	(3) Develop and im	plement a hazard	ous substance m	anagement plan; and	j		
	(4) Reporting and r	ecording incidents	S.				
				uality Assessment (A	ppendix E). These		
	recommendations		•				
				·	on Prevention Act of		
	1965 stipulated a list of requirements in terms of regulating emissions form diesel operated						

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vehicles/plant/equipment.

Activity:	37. Rehabilitation o	of the lay down ar	eas				
Impact:	Dust Generation	Dust Generation					
	Direct Impact: Re	lirect Impact: Re-vegetation of the remaining footprint of the mine must be done after the					
	reclamation. The in	npacts on the atn	nospheric enviror	nment during rehabilita	ation will be limited to		
	the vehicular activi	ity, spreading of	soil and profiling	g/contouring. The imp	act will be medium-		
	term, very limited o	n spatial scale, w	rith limited implica	ation on ambient air qu	uality.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	2	6	5	45		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	Fugitive dust gener	ration can be con	trolled in the foll	owing ways:			
	(1) Development of	f a dust fallout mo	onitoring and mar	nagement plan;			
	(2) Frequent Inspec	(2) Frequent Inspections; and					
	(3) Reporting and re	ecording incident	s related to air qu	uality.			
	A number of recom	nmendation resul	ted from the Air	Quality Assessment (Appendix E). These		
	recommendations	are included in	Part B of this re	eport. One of the red	commendations is to		
	develop a detailed	air quality manag	gement plan (fo	cusing on sources of	dust located in close		
	proximity to the re	esidential recept	ors within the p	project boundary) en	suring adherence to		
	thresholds stipulat	ted in the Base	eline Air Qualit	y Impact Assessme	nt report (BAQIAR)		
	(Appendix E) prior	to the commenc	ement of operation	ons.			
	There are also a nu	umber of legislativ	e requirements s	stipulated in the follow	ing regulations:		
	• GN R. 283	3: National report	ing regulations;				
	- CND 12	40. N - C 1 A l-					
	• GN R. 12	iu: inational Amb	ient Air quality sta	andards; and			

Activity:	38. Demolition of PCD's
Impact:	Dust Generation
	Direct Impact: 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. Demolition and removal of all
	infrastructures will cause fugitive dust emissions. Any implication this activity will have on
	ambient air quality will be short-term and localised.
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy
	environment for employees and surrounding communities.



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Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	6	5	40		
Post-Mitigation	1	1	2	3	12		
Mitigation Measures:	Fugitive dust gener	ration can be con t	trolled in the follo	wing ways:			
	(1) Development of	f a dust fallout mo	nitoring and mana	gement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and r	(3) Reporting and recording incidents related to air quality.					
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These						
	recommendations are included in Part B of this report. One of the recommendations is to						
	develop a detailed air quality management plan (focusing on sources of dust located in close						
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ens	uring adherence to		
	thresholds stipulat	ted in the Base	eline Air Quality	Impact Assessmen	t report (BAQIAR)		
	(Appendix E) prior	(Appendix E) prior to the commencement of operations.					
	There are also a nu	There are also a number of legislative requirements stipulated in the following regulations: • GN R. 283: National reporting regulations;					
	• GN R. 283						
	• GN R. 12 ⁻	10: National Ambi	ent Air quality star	ndards; and			

GN R. 897: National dust control regulations.

Activity:	39. Demolition of w	orkshops, waste s	storage facilities, f	uel storage facilities e	etc.
Impact:	Dust Generation				
	Direct Impact: Dis	mantling and den	nolition of existing	infrastructure, transp	oorting and handling
	of topsoil on unpay	red roads in order	to bring the site	to state suitable for a	Iternative land uses
	poses potential im	npacts on the at	mospheric enviro	onment. Demolition a	and removal of all
	infrastructures will	cause fugitive d	ust emissions. A	ny implication this a	ctivity will have on
	ambient air quality	will be short-term	and localised.		
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy				
	environment for em	ployees and surro	ounding communit	ties.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	6	5	40
Post-Mitigation	1	1	2	3	12
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follow	wing ways:	
	(1) Development of	a dust fallout mo	nitoring and mana	gement plan;	
	(2) Frequent Inspections; and				
	(3) Reporting and recording incidents related to air quality.				
	A number of recom	nmendation result	ed from the Air Q	uality Assessment (A	Appendix E). These

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recommendations are included in Part B of this report. One of the recommendations is to 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) (**Appendix E**) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Aspect:		Human Health and Safety					
	Activity:	35. Demolition / removal of portable and related infrastructure					
	Impact:	Dust Generation	Dust Generation				
		Direct Impact: Dis	mantling and dem	nolition of existing	infrastructure, transp	orting and handling	
		of topsoil on unpay	ed roads in order	to bring the site t	o state suitable for a	Iternative land uses	
		poses potential in	npacts on the at	mospheric enviro	nment. Demolition a	and removal of all	
		infrastructures will	cause fugitive d	ust emissions. Ai	ny implication this a	ctivity will have on	
		ambient air quality	will be short-term	and localised.			
		Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy					
		environment for em	ployees and surro	ounding communit	ies.		
Significar	nce rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	on	1	2	6	5	45	
Post-Mitigat	tion	1	1	4	4	24	
Mitigation I	Measures:	Fugitive dust gener	ation can be cont	<i>rolled</i> in the follow	ving ways:		
		(1) Development of	a dust fallout moi	nitoring and mana	gement plan;		
		(2) Frequent Inspec	ctions; and				
		(3) Reporting and re	ecording incidents	related to air qua	lity.		
		A number of recom	nmendation result	ed from the Air Q	uality Assessment (A	ppendix E). These	
		recommendations	are included in F	Part B of this rep	ort. One of the reco	mmendations is to	
		develop a detailed	air quality manag	ement plan (focu	sing on sources of d	ust 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)					
		(Appendix E) prior	to the commence	ment of operation	S.		
		There are also a nu	ımber of legislativ	e requirements sti	pulated in the followir	ng regulations:	



•	GN R. 283: National reporting regulations;
•	GN R. 1210: National Ambient Air quality standards; and
•	GN R. 897: National dust control regulations.

Activity:	36. Vehicular activi	ty: removal of mol	oile plant / equipm	nent and vehicles		
Impact:	Dust Generation	Dust Generation				
	Direct Impact: Tra	Direct Impact: Transportation of mobile plants / equipment and other materials from site can				
	lead to the genera	tion of fugitive du	st comprising TS	P, PM10 and PM2.5.	This activity will be	
	short-term, localise	ed, and will have	low impacts on	the atmospheric env	vironment once the	
	demolition ceases.					
	Indirect Impact: (Continuous expos	ure to high level	s of dust fallout may	lead to unhealthy	
	environment for em	ployees and surro	ounding communi	ties.		
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	1	2	6	5	45	
Post-Mitigation	1 1 4 4 24					
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follo	wing ways:		
	(1) Development of	(1) Development of a dust fallout monitoring and management plan;				
	(2) Frequent Inspec	ctions; and				
	(3) Reporting and r	(3) Reporting and recording incidents related to air quality.				
	A number of recommendation resulted from the Air Quality Assessment ($\mbox{\bf Appendix}~\mbox{\bf E}).$ These					
	recommendations	are included in F	Part B of this rep	oort. One of the reco	mmendations is to	
	develop a detailed	air quality manag	ement plan (foci	using on sources of d	ust located in close	
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ensu	uring adherence to	
	thresholds stipulat	ted in the Base	line Air Quality	Impact Assessment	t report (BAQIAR)	
	(Appendix E) prior	to the commence	ement of operation	ns.		
	There are also a nu	There are also a number of legislative requirements stipulated in the following regulations:				
	• GN R. 283	3: National reporting	ng regulations;			
	• GN R. 12 ²	10: National Ambi	ent Air quality star	ndards; and		
	• GNR 897	7: National dust co	ontrol regulations			

Activity:	37. Rehabilitation of the lay down areas
Impact:	Dust Generation
	Direct Impact: Re-vegetation of the remaining footprint of the mine must be done after the
	reclamation. The impacts on the atmospheric environment during rehabilitation will be limited to
	the vehicular activity, spreading of soil and profiling/contouring. The impact will be medium-

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Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	2	6	5	50		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	Fugitive dust gen	eration can be c o	ontrolled in the foll	owing ways:			
	(1) Development	of a dust fallout r	monitoring and mar	nagement plan;			
	(2) Frequent Insp	ections; and					
	(3) Reporting and	d recording incide	ents related to air qu	uality.			
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These						
	recommendation	s are included in	n Part B of this re	eport. One of the r	recommendations is t		
	develop a detaile	ed air quality mar	nagement plan (fo	cusing on sources	of dust located in close		
	proximity to the	residential rece	ptors within the p	project boundary) e	ensuring adherence to		
	thresholds stipu	lated in the Ba	aseline Air Qualit	y Impact Assessn	nent report (BAQIAR		
	(Appendix E) pri	or to the comme	ncement of operation	ons.			
	There are also a number of legislative requirements stipulated in the following regulations:						
	• GN R. 2	83: National repo	orting regulations;				
	GN R. 1210: National Ambient Air quality standards; and						
	• GN R. 8	97: National dust	control regulations	S.			

Activity:	38. Demolition of P	CD's			
Impact:	Dust Generation				
	Direct Impact: Dis	mantling and den	nolition of existing	infrastructure, transp	orting and handling
	of topsoil on unpay	ed roads in order	to bring the site	to state suitable for a	Iternative land uses
	poses potential in	npacts on the a	tmospheric envir	onment. Demolition a	and removal of all
	infrastructures will	cause fugitive d	ust emissions. A	any implication this a	ctivity will have on
	ambient air quality	will be short-term	and localised.		
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy				
	environment for em	ployees and surro	ounding communi	ties.	
Significance rating:	Duration Extent Magnitude Probability Significance				Significance
Pre-Mitigation	1	1	6	5	40
Post-Mitigation	1	1	2	4	16
Mitigation Measures:	Fugitive dust gener	ration can be con	trolled in the follo	wing ways:	
	(1) Development of a dust fallout monitoring and management plan;				
	(2) Frequent Inspec	(2) Frequent Inspections; and			
	(3) Reporting and r	ecording incidents	s related to air qua	ality.	

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A number of recommendation resulted from the Air Quality Assessment (**Appendix E**). These recommendations are included in Part B of this report. One of the recommendations is to 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) (**Appendix E**) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Activity:	39. Demolition of w	orkshops, waste s	storage		
Impact:	Dust Generation	Dust Generation			
	Direct Impact: Dis	Direct Impact: Dismantling and demolition of existing infrastructure, transporting and handling			
	of topsoil on unpay	red roads in order	to bring the site	to state suitable for a	Iternative land uses
	poses potential im	npacts on the at	tmospheric envir	onment. Demolition a	and removal of all
	infrastructures will	cause fugitive d	ust emissions. A	Any implication this a	ctivity will have on
	ambient air quality	will be short-term	and localised.		
	Indirect Impact: (Continuous expos	sure to high leve	ls of dust fallout may	lead to unhealthy
	environment for em	ployees and surro	ounding commun	ities.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	1	6	5	40
Post-Mitigation	1	1	2	4	16
Mitigation Measures:	Fugitive dust gener	ation can be con t	trolled in the follo	wing ways:	
	(1) Development of	a dust fallout mo	nitoring and mana	agement plan;	
	(2) Frequent Inspec	ctions; and			
	(3) Reporting and re	ecording incidents	s related to air qu	ality.	
	A number of recom	nmendation result	ed from the Air C	Quality Assessment (A	ppendix E). These
	recommendations	are included in F	Part B of this re	port. One of the reco	mmendations is to
	develop a detailed	air quality manag	gement plan (foc	using on sources of d	ust located in close
	proximity to the re	esidential recepto	ors within the pr	roject boundary) ensu	uring adherence to
	thresholds stipulat	thresholds stipulated in the Baseline Air Quality Impact Assessment report (BAQIAR)			
	(Appendix E) prior	to the commence	ement of operation	ns.	
	There are also a nu	ımber of legislativ	e requirements s	tipulated in the followir	ng regulations:
	• GN R. 283	3: National reporti	ng regulations;		



- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Aspect: Topography and Visual Environment	
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Activity:	35. Demolition / rer	noval of portable	and related infra	structure				
Impact:	Dust generation							
	Direct Impact: Clearing of vegetation for topsoil and subsoil stripping exposes the mining							
	operation area to dust generation. High levels of dust fallout will affect the overall air quality.							
	The generation of dust during these activities will affect the visual environment negatively.							
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy							
	environment for em	environment for employees and surrounding communities.						
Significance rating:	Duration	Ouration Extent Magnitude Probability Significance						
Pre-Mitigation	1	2	4	5	45			
Post-Mitigation	1	1	4	3	18			
Mitigation Measures:	Fugitive dust generation can be <i>controlled</i> in the following ways:							
	(1) Development of a dust fallout monitoring and management plan;							
	(2) Frequent Inspections; and							
	(3) Reporting and r	ecording incidents	s related to air qu	uality.				
	A number of recon	nmendation result	ted from the Air	Quality Assessment (A	ppendix E). These			
	recommendations	are included in I	Part B of this re	port. One of the reco	ommendations is to			
	develop a detailed	air quality manag	gement plan (foo	cusing on sources of d	ust located in close			
	proximity to the re	esidential recepto	ors within the p	roject boundary) ensi	uring adherence to			
	thresholds stipulat	ted in the Base	eline Air Quality	/ Impact Assessmen	t report (BAQIAR)			
	(Appendix E) prior	to the commence	ement of operation	ons.				
	There are also a nu	ımber of legislativ	e requirements s	tipulated in the followir	ng regulations:			
	• GN R. 283	3: National reporti	ng regulations;					
	• GN R. 12 ²	10: National Ambi	ent Air quality sta	andards; and				
	• GN R 897	7: National dust co	ontrol regulations					

Activity:	36. Vehicular activity: removal of mobile plant / equipment and vehicles
Impact:	Dust Generation
	Direct Impact: 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

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	demolition ceases.							
	Indirect Impact: (Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy						
	environment for employees and surrounding communities.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	1	2	6	5	45			
Post-Mitigation	1	1	4	4	24			
Mitigation Measures:	Fugitive dust gener	Fugitive dust generation can be <i>controlled</i> in the following ways:						
	(1) Development of a dust fallout monitoring and management plan;							
	(2) Frequent Inspections; and							
	(3) Reporting and recording incidents related to air quality.							
	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These							
	recommendations	are included in	Part B of this re	eport. One of the re	commendations is to			
	develop a detailed	air quality mana	agement plan (fo	cusing on sources of	dust located in close			
	proximity to the r	esidential recep	tors within the p	oroject boundary) er	nsuring adherence to			
	thresholds stipula	ted in the Bas	seline Air Qualit	y Impact Assessme	ent report (BAQIAR)			
	(Appendix E) prior	to the commend	cement of operation	ons.				
	There are also a nu	umber of legislati	ve requirements	stipulated in the follow	ving regulations:			
	• GN R. 283	3: National repor	ting regulations;					
	• GN R. 12	10: National Amb	pient Air quality sta	andards; and				
	• GN R. 89	7: National dust o	control regulations	S.				

Activity:	37. Rehabilitation of the lay down areas					
Impact:	Dust Generation					
	Direct Impact: Re	Direct Impact: Re-vegetation of the remaining footprint of the mine must be done after the				
	reclamation. The in	reclamation. The impacts on the atmospheric environment during rehabilitation will be limited to				
	the vehicular activ	the vehicular activity, spreading of soil and profiling/contouring. The impact will be medium-				
	term, very limited on spatial scale, with limited implication on ambient air quality.					
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	2	2	4	5	40	
Post-Mitigation	1 1 4 4 24					
Mitigation Measures:	Fugitive dust gener	ration can be <i>con</i>	trolled in the follo	wing ways:		
	(1) Development of	(1) Development of a dust fallout monitoring and management plan;				
	(2) Frequent Inspec	(2) Frequent Inspections; and				
	(3) Reporting and r	ecording incidents	s related to air qua	ality.		
	A number of recon	nmendation result	ed from the Air C	Quality Assessment (A	ppendix E). These	

recommendations are included in Part B of this report. One of the recommendations is to 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) (**Appendix E**) prior to the commencement of operations.

There are also a number of legislative requirements stipulated in the following regulations:

- GN R. 283: National reporting regulations;
- GN R. 1210: National Ambient Air quality standards; and
- GN R. 897: National dust control regulations.

Activity:	38. Demolition of P	CD's					
Impact:	Dust Generation	Dust Generation					
	Direct Impact: Dis	Direct Impact: Dismantling and demolition of existing infrastructure, transporting and handling					
	of topsoil on unpay	of topsoil on unpaved roads in order to bring the site to state suitable for alternative land uses					
	poses potential in	poses potential impacts on the atmospheric environment. Demolition and removal of all					
	infrastructures will	nfrastructures will cause fugitive dust emissions. Any implication this activity will have on					
	ambient air quality	ambient air quality will be short-term and localised.					
	Indirect Impact: (Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy					
	environment for em	environment for employees and surrounding communities.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	6	5	40		
Post-Mitigation	1 1 2 4 16						
Mitigation Measures:	Fugitive dust gener	Fugitive dust generation can be <i>controlled</i> in the following ways:					
	(1) Development of	a dust fallout mo	nitoring and mana	agement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and r	ecording incidents	related to air qua	ality.			
	A number of recon	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These					
	recommendations	are included in F	Part B of this rep	port. One of the reco	ommendations is to		
	develop a detailed	air quality manag	ement plan (foc	using on sources of d	ust located in close		
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ens	uring adherence to		
	thresholds stipulat	ed in the Base	line Air Quality	Impact Assessmen	t report (BAQIAR)		
	(Appendix E) prior	to the commence	ement of operation	ns.			
	There are also a nu	ımber of legislativ	e requirements st	ipulated in the followir	ng regulations:		
	• GN R. 283	3: National reportin	ng regulations;				
	• GN R. 12	10: National Ambie	ent Air quality sta	ndards; and			

GN R. 897: National dust control regulations.

Activity:	39. Demolition of w	39. Demolition of workshops, waste storage					
Impact:	Dust Generation	Dust Generation					
	Direct Impact: Dis	lirect Impact: Dismantling and demolition of existing infrastructure, transporting and handling					
	of topsoil on unpay	f topsoil on unpaved roads in order to bring the site to state suitable for alternative land uses					
	poses potential in	oses potential impacts on the atmospheric environment. Demolition and removal of all					
	infrastructures will	nfrastructures will cause fugitive dust emissions. Any implication this activity will have on					
	ambient air quality	ambient air quality will be short-term and localised.					
	Indirect Impact: Continuous exposure to high levels of dust fallout may lead to unhealthy						
	environment for employees and surrounding communities.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	6	5	40		
Post-Mitigation	1 1 2 4 16						
Mitigation Measures:	Fugitive dust gener	ation can be cont	trolled in the follo	wing ways:			
	(1) Development of	a dust fallout mo	nitoring and mana	igement plan;			
	(2) Frequent Inspec	ctions; and					
	(3) Reporting and re	ecording incidents	s related to air qua	ality.			
	A number of recom	A number of recommendation resulted from the Air Quality Assessment (Appendix E). These					
	recommendations	are included in F	Part B of this rep	ort. One of the reco	ommendations is to		
	develop a detailed	air quality manag	jement plan (foci	using on sources of d	ust located in close		
	proximity to the residential receptors within the project boundary) ensuring adherence to						
	proximity to the re	esidential recepto	ors within the pr	oject boundary) ensi	uring adherence to		
	1	•	•	oject boundary) ensi Impact Assessmen	•		
	1	ed in the Base	line Air Quality	Impact Assessmen	•		
	thresholds stipulat (Appendix E) prior	ted in the Base to the commence	eline Air Quality ement of operation	Impact Assessmen	t report (BAQIAR)		
	thresholds stipulat (Appendix E) prior There are also a nu	ted in the Base to the commence	eline Air Quality ement of operation e requirements st	Impact Assessmen	t report (BAQIAR)		
	thresholds stipulat (Appendix E) prior There are also a nu • GN R. 283	ted in the Base to the commence imber of legislative	eline Air Quality ement of operation e requirements st ng regulations;	Impact Assessments.	t report (BAQIAR)		



Aspect: Surface Water quality

Activity:	35. Demolition / rer	noval of portable	and related infrast	ructure			
Impact:	Hydrocarbon Con	tamination					
	Direct Impact: The	Direct Impact: The potential impact will arise during demolition of infrastructure, where					
	mobilisation of con	mobilisation of contaminants such as fuels containing hydrocarbons, waste, explosives, PCD					
	material to the surface water resources resulting in the contamination of those resources.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	2	8	5	60		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	lled in the following		
	ways:						
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing					
	handling, storage, and transport of hazardous substances.						
	(2) Develop and implement an emergency response procedure addressing the procedure in						
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or						
	accidents as well as addressing remediation procedures.						
	(3) Development and implementation of an incident reporting procedure.						
Impact:	General waste ger	neration & Litteri	ng				
	Direct Impact: The	oughout the deco	mmissioning phas	se of the project large	e amounts of waste		
		,		utting strain on loca			
		storage of large amounts of waste over an extended time in a area not lined or bunded poses a					
	risk of forming pote	•					
	-			waste storage faciliti	•		
				ources. This may lead	d to the degradation		
	of conditions for the			· · · · · · · · · · · · · · · · · · ·			
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	3	2	8	5	65		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:		· ·		ed in the following wa	•		
		mplement as wa	ste management	plan with the focus	on reuse, reduce,		
	recycle, or avoid.		, ,				
	(2) Development ar	nd maintenance o	t a waste disposal	record keeping syste	em.		



Activity:	36. Vehicular activi	ty: removal of mol	oile plant / equipm	ent and vehicles			
Impact:	Hydrocarbon Con	tamination					
	Direct Impact: He	avy vehicle activit	y used during the	decommissioning ph	ase is poses a risk		
	of leaking or spilling contaminants such as fuels containing hydrocarbons, waste, explosives,						
	PCD material to the	PCD material to the surface water resources resulting in the contamination of those resources.					
Significance rating:	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	2	1	8	5	55		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be controlled in the following					
	ways:	ways:					
	(1) Develop and implement a Hazardous substances management plan specifically addressing						
	handling, storage, and transport of hazardous substances.						
	(2) Develop and implement an emergency response procedure addressing the procedure in						
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or						
	accidents as well as addressing remediation procedures.						
	(3) Development ar	(3) Development and implementation of an incident reporting procedure.					
Impact:	Sedimentation and siltation of watercourses						
	Direct Impact: Co	nstructing and the	e use of access r	oads through drainag	ge lines may cause		
	sedimentation and	siltation of watero	ourses if not mana	aged properly.			
	Indirect Impact:	Storm water run	off of dirt roads	and un-vegetated	areas may cause		
	sedimentation and	siltation of nearby	watercourses.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	8	5	50		
Post-Mitigation	1	1	4	3	18		
Mitigation Measures:	Surface water qual	ty can be <i>control</i>	led in the followin	g ways:			
	1) Development an	d implementation	of water quality m	onitoring plan.			
	(2) Reporting and r	ecording incidents	3.				

Activity:	37. Rehabilitation of the lay down areas					
Impact:	Sedimentation and siltation of watercourses					
	Direct Impact: If areas remain un-vegetated and exposed run-off from these areas may					
	contain sediment and silt posing the risk of contaminating watercourses/rivers in close					
	proximity.					
Significance rating:	Duration Extent Magnitude Probability Significance					
Pre-Mitigation	5	2	8	5	75	



Post-Mitigation	1	1	4	3	18			
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:							
	1) Development and implementation of water quality monitoring plan.							
	(2) Reporting and r	(2) Reporting and recording incidents.						

Activity	38. Demolition of P	CD's			
Activity:					
Impact:	Hydrocarbon Con				
	Direct Impact: Heavy vehicle activity used during the decommissioning phase is poses a risk				
	of leaking or spilling	g contaminants s	such as fuels conf	aining hydrocarbons,	waste, explosives,
	PCD material to the	e surface water re	sources resulting	in the contamination of	of those resources.
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	1	2	8	5	55
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Potential impact re	sulting from hydro	ocarbon contamin	ation can be <i>control</i>	<i>led</i> in the following
	ways:				
	(1) Develop and im	plement a Hazaro	dous substances r	nanagement plan spe	ecifically addressing
	handling, storage, a	and transport of ha	azardous substan	ces.	
	(2) Develop and in	nplement an eme	ergency response	procedure addressin	g the procedure in
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or
	accidents as well as	s addressing reme	ediation procedure	es.	
	(3) Development and implementation of an incident reporting procedure.				
Impact:	Contamination of	water resource			
	Direct Impact: Dis	scharge, spills and	d leakage of efflu	ent containing polluta	ints poses a risk of
	contaminating water	er resources within	close proximity.		
	Indirect Impact: F	Pollutants poses a	a risk in altering t	he conditions of the	aquatic ecology to
	thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	2	8	5	60
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water r	nanagement plan.	
	(4) Reporting and re	ecording all relate	d incidents accord	ling to a developed pr	ocedure.

	(5) Develop and im	nplement an em	ergency preparedr	ess plan.		
Impact:	General waste ge	General waste generation & Littering				
	Direct Impact: Th	Direct Impact: Throughout the decommissioning phase of the project large amounts of waste				
	(general and haza	(general and hazardous waste) will be generated putting strain on local landfill sites. The				
	storage of large an	nounts of waste	over an extended	time in a area not lir	ned or bunded poses a	
	risk of forming pote	entially hazardo	us leachates.			
	Indirect Impact:	The hazardous	leachate from the	e waste storage fac	cilities poses a risk of	
	contaminating both	contaminating both surface and sub-surface water resources. This may lead to the degradation				
	of conditions for the	of conditions for the aquatic ecology to thrive.				
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	3	1	8	5	60	
Post-Mitigation	1	1	4	3	18	
Mitigation Measures:	Negative impacts of waste generation can be <i>controlled</i> in the following ways:			ways:		
	(1) Develop and	(1) Develop and implement as waste management plan with the focus on reuse, reduce,			cus on reuse, reduce,	
	recycle, or avoid.					
	(2) Development a	nd maintenance	e of a waste dispos	al record keeping sy	stem.	

Activity:	39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					
Impact:	Hydrocarbon Con	Hydrocarbon Contamination				
	Direct Impact: He	Direct Impact: Heavy vehicle activity used during the decommissioning phase is poses a risk				
	of leaking or spilling	g contaminants s	such as fuels co	ntaining hydrocarbons	, waste, explosives,	
	PCD material to the	e surface water re	sources resulting	in the contamination	of those resources.	
Significance rating:	Duration	Duration Extent Magnitude Probability Significance				
Pre-Mitigation	2	2	8	5	55	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contami	nation can be contro	Iled in the following	
	ways:					
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing			ecifically addressing	
	handling, storage, a	handling, storage, and transport of hazardous substances.				
	(2) Develop and ir	(2) Develop and implement an emergency response procedure addressing the procedure in			ng the procedure in	
	case of a chemical	spill. This proced	dure should ensu	ire the fastest possible	reaction to spills or	
	accidents as well a	s addressing rem	ediation procedu	res.		
	(3) Development ar	nd implementatior	n of an incident re	eporting procedure.		
Impact:	Contamination of	water resource				
	Direct Impact: Dis	scharge, spills an	d leakage of effl	uent containing polluta	ants poses a risk of	

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	contaminating water	er resources within	close proximity.		
	Indirect Impact: F	Pollutants poses a	a risk in altering t	the conditions of the	aquatic ecology to
	thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	2	8	5	60
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in th	ne following ways:	
	(1) Development ar	nd implementation	of a water monito	oring program.	
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan
	(IWWMP).				
	(3)Development an	d implementation	of a storm water r	management plan.	
	(4) Reporting and re	ecording all relate	d incidents accord	ling to a developed p	rocedure.
	(5) Develop and implement an emergency preparedness plan.				
Impact:	General waste ger	General waste generation & Littering			
	Direct Impact: Thr	Direct Impact: Throughout the decommissioning phase of the project large amounts of waste			
	(general and haza	rdous waste) wil	l be generated p	utting strain on loca	I landfill sites. The
	storage of large am	storage of large amounts of waste over an extended time in a area not lined or bunded poses a			or bunded poses a
	risk of forming pote	ntially hazardous	leachates.		
	Indirect Impact: 7	The hazardous le	achate from the	waste storage faciliti	ies poses a risk of
	contaminating both	surface and sub-	surface water res	ources. This may lead	d to the degradation
	of conditions for the	e aquatic ecology	to thrive.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	2	8	5	65
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Negative impacts o	f waste generation	n can be <i>controll</i>	ed in the following wa	ys:
	(1) Develop and i	mplement as wa	ste management	plan with the focus	on reuse, reduce,
	recycle, or avoid.				
	(2) Development ar	nd maintenance o	f a waste disposal	record keeping syste	em.

Aspect:		Ground Water Quality
	Activity:	35. Demolition / removal of portable and related infrastructure
	Impact:	Hydrocarbon Contamination
		Direct Impact: The potential impact will arise during demolition of infrastructure, where
		mobilisation of contaminants such as fuels containing hydrocarbons, waste, explosives, PCD

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	material to the surf	material to the surface water resources resulting in the contamination of those resources.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	8	5	60	
Post-Mitigation	1	1	6	1	8	
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following				
	ways:					
	(1) Develop and implement a Hazardous substances management plan specifically addressing handling, storage, and transport of hazardous substances.					
	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well a	accidents as well as addressing remediation procedures.				
	(3) Development a	nd implementat	ion of an incident r	eporting procedure.		

Activity:	36. Vehicular activi	ty: removal of m	obile plant / equip	ment and vehicles		
Impact:	Hydrocarbon Contamination					
	Direct Impact: He	Direct Impact: Heavy vehicle activity used during the decommissioning phase is poses a risk				
	of leaking or spilling	g contaminants	such as fuels co	ntaining hydrocarbons	s, waste, explosives,	
	PCD material to the	e surface water r	esources resulting	g in the contamination	of those resources.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	1	8	5	55	
Post-Mitigation	1	1	6	1	8	
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following				
	ways:					
	(1) Develop and im	(1) Develop and implement a Hazardous substances management plan specifically addressing			ecifically addressing	
	handling, storage, and transport of hazardous substances.					
	(2) Develop and ir	nplement an en	nergency respons	e procedure addressi	ng the procedure in	
	case of a chemical	spill. This proce	edure should ensu	ure the fastest possible	e reaction to spills or	
	accidents as well a	s addressing rer	nediation procedu	res.		
	(3) Development ar	nd implementation	on of an incident re	eporting procedure.		

Activity:	38. Demolition of PCD's
Impact:	Hydrocarbon Contamination
	Direct Impact: 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.

Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	1	8	5	55	
Post-Mitigation	1	1	6	1	8	
Mitigation Measures:	Potential impact re	Potential impact resulting from hydrocarbon contamination can be controlled in the following				
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances i	management plan spe	ecifically addressing	
	handling, storage, a	and transport of h	azardous substan	ces.		
	(2) Develop and ir	mplement an eme	ergency response	procedure addressir	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing reme	ediation procedure	es.		
	(3) Development ar	nd implementation	of an incident rep	porting procedure.		
Impact:	Contamination of	Contamination of water resource				
	Direct Impact: Dis	scharge, spills and	d leakage of efflu	ent containing polluta	ants poses a risk of	
	contaminating water	contaminating water resources within close proximity.				
	Indirect Impact: F	Indirect Impact: Pollutants poses a risk in altering the conditions of the aquatic ecology to				
	thrive.	thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	8	5	60	
Post-Mitigation	1	1	6	2	16	
Mitigation Measures:	Contamination of w	ater resources ca	n be avoided in t	he following ways:		
	(1) Development ar	nd implementation	of a water monito	oring program.		
	(2) Development a	and implementation	on of an Integrate	ed Water and Waste	Management Plan	
	(IWWMP).					
	(3)Development an	d implementation	of a storm water	management plan.		
	(4) Reporting and r	ecording all relate	d incidents accord	ding to a developed p	rocedure.	
	(5) Develop and im	plement an emerç	gency preparedne	ss plan.		

Activity:	39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.				
Impact:	Hydrocarbon Contamination				
	Direct Impact: He	Direct Impact: Heavy vehicle activity used during the decommissioning phase is poses a risk			
	of leaking or spilling	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.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	1	8	5	55
Post-Mitigation	1	1	6	2	16

Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be <i>controlled</i> in the following				
	ways:				
	(1) Develop and im	nplement a Hazar	dous substances	management plan spe	ecifically addressing
	handling, storage, and transport of hazardous substances.				
	(2) Develop and ir	mplement an eme	ergency response	e procedure addressir	ng the procedure in
	case of a chemical	spill. This proce	dure should ensu	re the fastest possible	reaction to spills or
	accidents as well a	s addressing rem	ediation procedur	es.	
	(3) Development a	nd implementation	n of an incident re	porting procedure.	
Impact:	Contamination of	water resource			
	Direct Impact: Dis	scharge, spills an	d leakage of efflo	uent containing polluta	ants poses a risk of
	contaminating water	er resources within	n close proximity.		
	Indirect Impact: F	Pollutants poses	a risk in altering	the conditions of the	aquatic ecology to
	thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Significance rating: Pre-Mitigation	Duration 2	Extent 2	Magnitude 8	Probability 5	Significance 60
				-	_
Pre-Mitigation	2	2	8 6	5 2	60
Pre-Mitigation Post-Mitigation	2	2 1 vater resources ca	8 6 an be avoided in	5 2 the following ways:	60
Pre-Mitigation Post-Mitigation	2 1 Contamination of w (1) Development ar	2 1 vater resources cand implementation	8 6 an be avoided in of a water monit	5 2 the following ways:	60
Pre-Mitigation Post-Mitigation	2 1 Contamination of w (1) Development ar	2 1 vater resources cand implementation	8 6 an be avoided in of a water monit	5 2 the following ways:	60
Pre-Mitigation Post-Mitigation	2 1 Contamination of w (1) Development at (2) Development a	2 1 vater resources cand implementation and implementation	8 6 an be avoided in of a water moniton of an Integrat	the following ways: coring program.	60
Pre-Mitigation Post-Mitigation	2 1 Contamination of w (1) Development as (2) Development as (IWWMP). (3)Development an	2 /ater resources cand implementation and implementation and implementation and implementation	8 6 an be avoided in of a water moniton of an Integral	the following ways: coring program.	60 16 Management Plan

Aspect:	Wetlands and Aquatic Ecology

Activity:	36. Vehicular activity: removal of mobile plant / equipment and vehicles							
Impact:	Sedimentation and	d siltation of wat	ercourses					
	Direct Impact: Co	nstructing and the	e use of access r	oads through drainag	ge lines may cause			
	sedimentation and	siltation of waterc	ourses if not mana	aged properly.				
	Indirect Impact: Storm water runoff of dirt roads and un-vegetated areas may cause							
	sedimentation and siltation of nearby watercourses.							
Significance rating:	Duration	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	1	1 1 8 5						
Post-Mitigation	1	1	4	2	12			



Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:					
	1) Development and implementation of water quality monitoring plan.					
	(2) Reporting and recording incidents.					

Activity:	37. Rehabilitation of the lay down areas							
Impact:	Sedimentation and	d siltation of wat	tercourses					
	Direct Impact: If	areas remain ui	n-vegetated and	exposed run-off fron	n these areas may			
	contain sediment	and silt posing	the risk of con	taminating watercour	rses/rivers in close			
	proximity.							
Significance rating:	Duration	Extent	Magnitude	Probability	Significance			
Pre-Mitigation	3	3 2 8 5 65						
Post-Mitigation	1	1 1 4 2 12						
Mitigation Measures:	Surface water quality can be <i>controlled</i> in the following ways:							
	1) Development an	1) Development and implementation of water quality monitoring plan.						
	(2) Reporting and r	ecording incident	S.					

Activity:	38. Demolition of PCD's						
Impact:	Contamination of	Contamination of water resource					
	-	Direct Impact: Discharge, spills and leakage of effluent containing pollutants poses a risk of contaminating water resources within close proximity.					
	Indirect Impact: F	Pollutants poses	a risk in altering	the conditions of the	aquatic ecology to		
	thrive.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2 2 8 5 60						
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Contamination of w	ater resources	can be <i>avoided</i> in	the following ways:			
	(1) Development a	nd implementati	on of a water mon	itoring program.			
	(2) Development a	and implementa	tion of an Integra	ted Water and Waste	Management Plan		
	(IWWMP).	(IWWMP).					
	(3)Development an	d implementation	on of a storm water	r management plan.			
	(4) Reporting and r	(4) Reporting and recording all related incidents according to a developed procedure.					
	(5) Develop and im	plement an eme	ergency preparedn	ess plan.			

Activity:	39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.
Impact:	Contamination of water resource

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Direct Impact: Discharge, spills and leakage of effluent containing pollutants poses a risk of contaminating water resources within close proximity.

Indirect Impact: Pollutants poses a risk in altering the conditions of the aquatic ecology to thrive

Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	2	8	5	60
Post-Mitigation	1	1	6	3	24

Mitigation Measures:

Contamination of water resources can be **avoided** in the following ways:

- (1) Development and implementation of a water monitoring program.
- (2) Development and implementation of an Integrated Water and Waste Management Plan (IWWMP).
- (3)Development and implementation of a storm water management plan.
- (4) Reporting and recording all related incidents according to a developed procedure.
- (5) Develop and implement an emergency preparedness plan.

Aspect:	Soil Quality

Activity:	35. Demolition / removal of portable and related infrastructure					
Impact:	Hydrocarbon Con	tamination				
	Direct Impact: TI	ne potential impa	act will arise du	ring demolition of in	frastructure, where	
	mobilisation of con	taminants such a	s fuels containing	g hydrocarbons, wast	e, explosives, PCD	
	material to the surfa	ace water resourc	es resulting in the	contamination of thos	se resources.	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	2	2	8	5	60	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamir	nation can be <i>control</i>	lled in the following	
	ways:					
	(1) Develop and im	plement a Hazaro	dous substances	management plan spe	ecifically addressing	
	handling, storage,	and transport of h	azardous substan	ces.		
	(2) Develop and ir	nplement an eme	ergency response	procedure addressing	ng the procedure in	
	case of a chemical	spill. This proced	dure should ensur	e the fastest possible	reaction to spills or	
	accidents as well a	s addressing rem	ediation procedure	es.		
	(3) Development a	(3) Development and implementation of an incident reporting procedure.				
Impact:	Degradation of so	il resources				
	Direct Impact: Po	or management	of topsoil and su	bsoil poses a risk to	degradation of soil	

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	resources.				
	Indirect Impact: Degradation of soil resources poses a risk in altering the conditions for micro				
	organisms to thrive		Toolan oo pool	a non m anomig and	
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	1	6	5	60
Post-Mitigation	1	1	4	3	18
Mitigation Measures:	Degradation of soil	resources can be	remedied in the	following ways:	
	(1) Develop and im	plement soil cons	ervation and stock	xpile management pla	n.
	(2) Develop and im	plement a Rehabi	litation plan.		
Impact:	Erosion – Loss of	fertile soil			
	Indirect Impact: E	Exposed un-vegeta	ated rehabilitated	areas pose a high ris	sk of erosion. This
	may lead to the los	s of fertile soil and	d in its turn affect	the micro-ecosystems	of the surrounding
	environment.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	5	2	8	5	75
Post-Mitigation	1	1	4	4	24
Mitigation Measures:	Erosion can be <i>cor</i>	ntrolled in the follo	owing ways:		
	(1) Development ar	nd implementation	of a storm water	management plan.	
	(2) Regular inspect	ion of erosion pro	ne areas for signs	of erosion.	
	(3) A soil conservat	tion and stockpilin	g plan to be deve	oped and implemente	ed.
	(4) Monthly monitor	ring of water quali	ty (as per recomm	endation of specialist	study).
Impact:	General waste ger	neration & Litteri	ng		
	Direct Impact: The	roughout the deco	ommissioning pha	se of the project large	e amounts of waste
	(general and haza	irdous waste) wil	l be generated p	utting strain on loca	I landfill sites. The
	storage of large am	nounts of waste ov	ver an extended ti	me in a area not lined	or bunded poses a
	risk of forming pote	ntially hazardous	leachates.		
	Indirect Impact: 7	The hazardous le	achate from the	waste storage faciliti	es poses a risk of
	contaminating both	surface and sub-	surface water res	ources. This may lead	to the degradation
	of conditions for the	e aquatic ecology	to thrive.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	3	2	8	5	65
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Negative impacts o	f waste generation	n can be <i>controll</i>	ed in the following wa	ys:
	(1) Develop and i	mplement as wa	ste management	plan with the focus	on reuse, reduce,
	recycle, or avoid.				

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(2) Development and maintenance of a waste disposal record keeping system.

Activity:	36. Vehicular activi	ty: removal of mo	bile plant / equipn	nent and vehicles			
Impact:	Hydrocarbon Contamination						
	Direct Impact: He	Direct Impact: Heavy vehicle activity used during the decommissioning phase is poses a risk					
	of leaking or spillir	ng contaminants s	such as fuels con	taining hydrocarbons,	waste, explosives,		
	PCD material to the	e surface water re	sources resulting	in the contamination of	of those resources.		
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	2	1	8	5	55		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Potential impact re	sulting from hydr	ocarbon contamir	nation can be <i>control</i>	led in the following		
	ways:						
	(1) Develop and im	nplement a Hazar	dous substances	management plan spe	ecifically addressing		
	handling, storage,	and transport of h	azardous substan	ces.			
	(2) Develop and in	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well a	accidents as well as addressing remediation procedures.					
	(3) Development a	nd implementatior	n of an incident re	porting procedure.			
Impact:	Erosion – Loss of	fertile soil					
	Indirect Impact: E	Exposed un-veget	ated rehabilitated	areas pose a high ris	sk of erosion. This		
	may lead to the los	s of fertile soil an	d in its turn affect	the micro-ecosystems	s of the surrounding		
	environment.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	1	1	8	5	50		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	Erosion can be con	ntrolled in the foll	owing ways:				
	(1) Development a	nd implementatior	n of a storm water	management plan.			
	(2) Regular inspect	tion of erosion pro	ne areas for signs	s of erosion.			
	(3) A soil conserva	tion and stockpilin	g plan to be deve	loped and implemente	ed.		
	(4) Monthly monito	(3) A soil conservation and stockpiling plan to be developed and implemented.(4) Monthly monitoring of water quality (as per recommendation of specialist study).					

Activity:	37. Rehabilitation of the lay down areas
Impact:	Erosion – Loss of fertile soil
	Indirect Impact: Exposed un-vegetated rehabilitated areas pose a high risk of erosion. This
	may lead to the loss of fertile soil and in its turn affect the micro-ecosystems of the surrounding

	environment.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	3	2	8	5	65	
Post-Mitigation	1	1	4	4	24	
Mitigation Measures:	Erosion can be cor	ntrolled in the follo	owing ways:			
	(1) Development ar	nd implementation	of a storm water	management plan.		
	(2) Regular inspect	ion of erosion pro	ne areas for signs	of erosion.		
	(3) A soil conservat	tion and stockpilin	g plan to be deve	loped and implemente	ed.	
	(4) Monthly monitor	ring of water quali	ty (as per recomm	nendation of specialist	study).	
Impact:	Degradation of so	il resources				
	Direct Impact: Po	or management	of topsoil and sul	bsoil poses a risk to	degradation of soil	
	resources.					
	Indirect Impact: D	egradation of soil	resources poses	a risk in altering the	conditions for micro	
	organisms to thrive	in.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	1	8	5	70	
Post-Mitigation	1	1	4	3	18	
Mitigation Measures:	Degradation of soil	Degradation of soil resources can be <i>remedied</i> in the following ways:				
	(1) Develop and im	plement soil cons	ervation and stocl	kpile management pla	n.	
	(2) Develop and im	(2) Develop and implement a Rehabilitation plan.				

Activity:	38. Demolition of PCD's				
Impact:	Hydrocarbon Contamination				
	Direct Impact: 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.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance
Pre-Mitigation	2	2	8	5	60
Post-Mitigation	1	1	6	3	24
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be controlled in the following				
	ways:				
	(1) Develop and implement a Hazardous substances management plan specifically addressing				
	handling, storage, and transport of hazardous substances. (2) Develop and implement an emergency response procedure addressing the procedure in				
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or				



	accidents as well as addressing remediation procedures.						
	(3) Development and implementation of an incident reporting procedure.						
Impact:	Degradation of soil resources						
	Direct Impact: Po	or management	of topsoil and sub	osoil poses a risk to	degradation of soil		
	resources.						
	Indirect Impact: Degradation of soil resources poses a risk in altering the conditions for micro						
	organisms to thrive in.						
Significance rating:	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	5	1	8	5	70		
Post-Mitigation	1	1	4	3	18		
Mitigation Measures:	Degradation of soil	resources can be	remedied in the f	following ways:			
	(1) Develop and im	plement soil cons	ervation and stock	pile management pla	n.		
	(2) Develop and implement a Rehabilitation plan.						
Impact:	Erosion – Loss of	fertile soil					
	Indirect Impact: Exposed un-vegetated rehabilitated areas pose a high risk of erosion. This						
	may lead to the loss of fertile soil and in its turn affect the micro-ecosystems of the surrounding						
	environment.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	3	2	8	5	65		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	Erosion can be <i>controlled</i> in the following ways:						
gadon mododios.	Liosion can be con	ntrolled in the follo	owing ways:				
gualon moudulos.	(1) Development a		• •	management plan.			
gudon mododios.		nd implementation	of a storm water				
magadon mododios.	(1) Development au (2) Regular inspect	nd implementation	of a storm water ne areas for signs		ed.		
magadon mododios.	(1) Development at (2) Regular inspect (3) A soil conservation	nd implementation ion of erosion pro- tion and stockpilin	of a storm water ne areas for signs g plan to be devel	of erosion.			
Impact:	(1) Development at (2) Regular inspect (3) A soil conservation	nd implementation tion of erosion pro- tion and stockpilin- ring of water quali	of a storm water ne areas for signs g plan to be devel ty (as per recomm	of erosion. oped and implemente			
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste ge	nd implementation tion of erosion pro- tion and stockpilin- ring of water qualit neration & Litteri	of a storm water ne areas for signs g plan to be devel ty (as per recomm	of erosion. oped and implemente	study).		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The	nd implementation cion of erosion protion and stockpiling ring of water quality neration & Litteri roughout the deco	n of a storm water ne areas for signs g plan to be devel ty (as per recomm	of erosion. oped and implemente	study).		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The (general and haza	nd implementation rion of erosion protion and stockpiling ring of water qualification & Litteri roughout the decordance waste) will	of a storm water ne areas for signs g plan to be devel ty (as per recomm ng ommissioning phase	of erosion. oped and implemente endation of specialist se of the project large	e amounts of waste		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The (general and haza	nd implementation rion of erosion protion and stockpiling ring of water qualification & Litteri roughout the decordance waste) will nounts of waste over the counts of waste or the cou	n of a storm water ne areas for signs g plan to be devel ty (as per recomm ng ommissioning phase I be generated power an extended tire	of erosion. oped and implemente endation of specialist se of the project large utting strain on loca	e amounts of waste		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The (general and hazar storage of large arm risk of forming potes)	and implementation of erosion pro- tion and stockpiling of water qualification & Litterication & Litterication waste) will mounts of waste over tially hazardous	nof a storm water ne areas for signs g plan to be devel ty (as per recomm ng mmissioning phase be generated power an extended tire leachates.	of erosion. oped and implemente endation of specialist se of the project large utting strain on loca	e amounts of waste I landfill sites. The or bunded poses a		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The (general and hazar storage of large and risk of forming pote Indirect Impact: The Indirect Impact: The Indirect Impact: The Impact (1) Provided the Impact (2) Regular Impact (3)	nd implementation ition of erosion protion and stockpiling ring of water qualification & Littericoughout the decorations waste) will mounts of waste overtially hazardous le	of a storm water ne areas for signs g plan to be devel ty (as per recomm ng ommissioning phase l be generated p ver an extended tir leachates. achate from the	of erosion. oped and implemente endation of specialist see of the project large utting strain on locate in a area not lined	e amounts of waste I landfill sites. The or bunded poses a es poses a risk of		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The (general and hazar storage of large and risk of forming pote Indirect Impact: The Indirect Impact: The Indirect Impact: The Impact (1) Provided the Impact (2) Regular Impact (3)	ion of erosion pro- tion and stockpilin- ring of water qualit neration & Litteri roughout the deco ardous waste) will nounts of waste over entially hazardous The hazardous le	ne areas for signs g plan to be devel ty (as per recomm ng mmissioning phase be generated per an extended tire leachates. achate from the surface water reso	of erosion. oped and implemented endation of specialist see of the project large utting strain on local me in a area not lined waste storage facilities.	e amounts of waste I landfill sites. The I or bunded poses a es poses a risk of		
·	(1) Development and (2) Regular inspect (3) A soil conservation (4) Monthly monitor General waste get Direct Impact: The (general and hazar storage of large amount isk of forming pote Indirect Impact: The contaminating both	ion of erosion pro- tion and stockpilin- ring of water qualit neration & Litteri roughout the deco ardous waste) will nounts of waste over entially hazardous The hazardous le	ne areas for signs g plan to be devel ty (as per recomm ng mmissioning phase be generated per an extended tire leachates. achate from the surface water reso	of erosion. oped and implemented endation of specialist see of the project large utting strain on local me in a area not lined waste storage facilities.	e amounts of waste I landfill sites. The I or bunded poses a es poses a risk of		



Post-Mitigation	1	1	4	3	18
Mitigation Measures:	Negative impacts of waste generation can be <i>controlled</i> in the following ways:				
	(1) Develop and implement as waste management plan with the focus on reuse, reduce,				
	recycle, or avoid.				
	(2) Development and maintenance of a waste disposal record keeping system.				

Activity:	39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.					
Impact:	Hydrocarbon Contamination					
	Direct Impact: 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.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	1	8	5	70	
Post-Mitigation	1	1	6	3	24	
Mitigation Measures:	Potential impact resulting from hydrocarbon contamination can be controlled in the following					
	ways:					
	(1) Develop and implement a Hazardous substances management plan specifically addressing					
	handling, storage, and transport of hazardous substances.					
	(2) Develop and implement an emergency response procedure addressing the procedure in					
	case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or					
	accidents as well as addressing remediation procedures.					
	(3) Development and implementation of an incident reporting procedure.					
Impact:	Degradation of soil resources					
	Direct Impact: Po	or management	of topsoil and su	bsoil poses a risk to	degradation of soil	
	resources.					
	Indirect Impact: Degradation of soil resources poses a risk in altering the conditions for micro					
	organisms to thrive in.					
Significance rating:	Duration	Extent	Magnitude	Probability	Significance	
Pre-Mitigation	5	1	8	5	70	
Post-Mitigation	1	1	4	3	18	
Mitigation Measures:	Degradation of soil resources can be <i>remedied</i> in the following ways:					
	(1) Develop and implement soil conservation and stockpile management plan.					
	(2) Develop and implement a Rehabilitation plan.					
Impact:	Erosion – Loss of fertile soil					
	Indirect Impact: Exposed un-vegetated rehabilitated areas pose a high risk of erosion. This					

Aspect:

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	may lead to the loss of fertile soil and in its turn affect the micro-ecosystems of the surrounding						
	environment.						
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	3	2	8	5	65		
Post-Mitigation	1	1	4	4	24		
Mitigation Measures:	Erosion can be <i>controlled</i> in the following ways:						
	(1) Development ar	nd implementation	of a storm water	management plan.			
	(2) Regular inspecti	ion of erosion pro	ne areas for signs	of erosion.			
	(3) A soil conservat	ion and stockpilin	g plan to be devel	oped and implemente	ed.		
	(4) Monthly monitor	ing of water quali	ty (as per recomm	endation of specialist	study).		
Impact:	General waste generation & Littering						
	Direct Impact: Throughout the decommissioning phase of the project large amounts of waste						
	(general and haza	rdous waste) wil	l be generated p	utting strain on loca	I landfill sites. The		
	storage of large am	ounts of waste ov	ver an extended ti	me in a area not lined	or bunded poses a		
	risk of forming pote	ntially hazardous	leachates.				
	Indirect Impact: T	he hazardous le	achate from the	waste storage faciliti	es poses a risk of		
	contaminating both	surface and sub-	surface water res	ources. This may lead	d to the degradation		
	of conditions for the	aquatic ecology	to thrive.				
Significance rating:	Duration	Extent	Magnitude	Probability	Significance		
Pre-Mitigation	5	1	8	5	70		
Post-Mitigation	1	1	6	3	24		
Mitigation Measures:	Negative impacts of	f waste generation	n can be <i>controll</i>	ed in the following wa	ys:		
	(1) Develop and in	mplement as wa	ste management	plan with the focus	on reuse, reduce,		
	recycle, or avoid.						
	(2) Development ar	nd maintenance o	f a waste disposal	record keeping syste	m.		

Activity:	37. Rehabilitation of the lay down areas
Impact:	Vegetation and habitat loss
	Direct Impact: Improper rehabilitation measures implemented poses a risk of permanently
	degraded areas void of vegetation and causing further degradation of adjacent vegetation and
	possible increased habitat loss. The conditions for macro and micro organisms needs to be
	suitable for reinstatement of the ecosystem. Loss of indigenous vegetation, increase in runoff
	and erosion, possible permanent degradation and increased establishment of alien invasive

Terrestrial Ecosystems

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species, possible disturbance and reduction of habitat, injury or death to terrestrial fauna,							
possible change of natural runoff and drainage patterns causing accelerated erosion, possible							
loss of protected species, possible permanent loss of re-vegetation potential of soil surface,							
increase in dust le	evels, interference	e with fauna beh	avioural activities, po	ossible exposure of			
fauna and flora to c	contaminants – es	pecially hydrocart	oons and increased du	ust levels			
Duration	Extent	Magnitude	Probability	Significance			
5	2	10	5	85			
1	1	6	4	32			
The loss of vegetat	ion can be <i>remed</i>	lied in the following	g ways:				
(1) Development and implementation of a rehabilitation plan.							
(2) Develop and im	plement a plant sp	pecies search and	I rescue management	plan.			
Influx of alien inva	asive vegetation						
Direct Impact: Site clearing for roads, lay down areas, and mining area exposes the un-							
vegetated area to	the influx of alie	n invasive vegeta	ation causing irrevers	ible damage to the			
native fauna and flo	ora species degra	dation and/or and	loss of habitats.				
Duration	Extent	Magnitude	Probability	Significance			
3	2	8	5	65			
1 1 4 3 18							
1	1	4	3	18			
1 The influx of alien in	1 nvasive vegetation	•	3 ed in the following wa				
	J	n can be controll	~				
(1) Development ar	nd implementation	n can be controll n of an alien and ir	ed in the following wa	ys:			
	possible change of loss of protected sincrease in dust lefauna and flora to control of the loss of vegetate (1) Development and (2) Develop and implicated impact: Since vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of vegetated area to native fauna and flot of the loss of	possible change of natural runoff and loss of protected species, possible increase in dust levels, interference fauna and flora to contaminants – estending to the fauna and flora to contaminants – estending to the fauna and flora to contaminants – estending to the fauna and flora to contaminants – estending to the fauna and flora species degraments. Duration Extent Duration Extent	possible change of natural runoff and drainage patter loss of protected species, possible permanent loss of increase in dust levels, interference with fauna behind fauna and flora to contaminants – especially hydrocard Duration Extent Magnitude 5 2 10 1 1 6 The loss of vegetation can be remedied in the following (1) Development and implementation of a rehabilitation (2) Develop and implement a plant species search and Influx of alien invasive vegetation Direct Impact: Site clearing for roads, lay down and vegetated area to the influx of alien invasive vegetation and/or and Duration Extent Magnitude Magnitude	possible change of natural runoff and drainage patterns causing accelerate loss of protected species, possible permanent loss of re-vegetation poter increase in dust levels, interference with fauna behavioural activities, possible fauna and flora to contaminants – especially hydrocarbons and increased dustriation Extent Magnitude Probability Duration Extent Magnitude Probability			

Aspect:	Noise Quality

Activity:	35. Demolition / removal of portable and related infrastructure								
Impact:	Noise Generation								
	Direct Impact: The	Direct Impact: The use of unmaintained equipment and plant throughout the decommissioning							
	phase poses a risk of generating noise.								
Significance rating:	Duration	Duration Extent Magnitude Probability Significance							
Pre-Mitigation	1	1 2 6 5 45							
Post-Mitigation	1	1 1 4 3 18							
Mitigation Measures:	Noise generation can be <i>controlled</i> in the following ways:								
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as								
	part of the EMS	S. A monitoring	program to be	developed based	on the specialist				



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recommendations (Appendix F).
(2) Recording, reporting, and remediating incidents related to noise.
(3) Regular inspections of vehicles/equipment/plant.

Activity:	36. Vehicular activity: removal of mobile plant / equipment and vehicles								
Impact:	Noise Generation								
	Direct Impact: The use of unmaintained equipment and plant throughout the decommissioning phase poses a risk of generating noise.								
Significance rating:	Duration Extent Magnitude Probability Significance								
Pre-Mitigation	1	1	6	5	40				
Post-Mitigation	1	1	4	3	18				
Mitigation Measures:	Noise generation can be <i>controlled</i> in the following ways:								
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as								
	part of the EMS. A monitoring program to be developed based on the specialist								
	recommendations (Appendix F).								
	(2) Recording, repo	(2) Recording, reporting, and remediating incidents related to noise.							
	(3) Regular inspect	ions of vehicles/e	quipment/plant.						

Activity:	38. Demolition of PCD's									
Impact:	Noise Generation									
	Direct Impact: The	e use of unmaint	ained equipment	and plant throughout th	ne decommissioning					
	phase poses a risk	of generating no	oise.							
Significance rating:	Duration	Duration Extent Magnitude Probability Significance								
Pre-Mitigation	1 1 4 5 30									
Post-Mitigation	1	1	4	3	18					
Mitigation Measures:	Noise generation can be <i>controlled</i> in the following ways:									
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as									
	part of the EMS. A monitoring program to be developed based on the specialist									
	recommendations (Appendix F).									
	(2) Recording, reporting, and remediating incidents related to noise.									
	(3) Regular inspect	ions of vehicles/	equipment/plant.							



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Activity:	39. Demolition of workshops, waste storage							
Impact:	Noise Generation							
	Direct Impact: If	vehicles used to	demolish these	areas are not mainta	ained and serviced			
	regularly high levels	s of noise may res	sult throughout the	e construction and ope	erational phase.			
Significance rating:	Duration	Duration Extent Magnitude Probability Significance						
Pre-Mitigation	1	1	6	5	40			
Post-Mitigation	1 1 4 3 18							
Mitigation Measures:	Noise generation ca	an be controlled	in the following wa	ays:				
	(1) Development and implementation of an Acoustical Measurement & Audit Programme as							
	part of the EMS. A monitoring program to be developed based on the specialist							
	recommendations (Appendix F).							
	(2) Recording, repo	(2) Recording, reporting, and remediating incidents related to noise.						
	(3) Regular inspect	ions of vehicles/e	quipment/plant.					

A detailed impact assessment can be found in $\mbox{\bf Appendix}\ \mbox{\bf R}.$

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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 Basic 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 10.

Table 10: 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	5 - permanent
prevention measures)	
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



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

Significance Points (SP) = (Magnitude + Duration + Extent) x 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

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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)

The advantages and disadvantages of the site layout have been discussed in the various specialist Reports. For the reasons specified in section i) (Part A) of this report there are no Project related alternatives.

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
- Phase 1: Klarinet Koppie mining near the discontinued Clarinet Mine could proceed
- Phase 3: Tubatse Koppie mining could proceed but with caution
- 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



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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 527m3/month and 8 065m3/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.

Refer in addition to Table 10 (section i) 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.

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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.

At the time of submitting this report to the competent authority the following infrastructures did not form part of the site layout:

- Storm water infrastructure;
- Location of PCD's; and
- Detailed infrastructure associated to the Tubatse lay down area.

It is therefore recommended that before authorising the activity a detailed site layout plan be submitted indicating the details of all infrastructure associated to the proposed mining development.

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 where considered in the site layout attached as **Appendix C**.

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 project and will be utilised as part of the proposed activities highlighted in this report. The site layout (**Appendix C**) 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.)



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Environmental Management Assistance (Pty) Ltd as the appointed EAP took an ¹Integrated 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.

Table 12 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 R** to this report.

¹ 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.

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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)

This section identifies all potential impacts associated to the proposed activities associated with the construction, operation, and decommissioning phase of the proposed mining project. Each possible impact have been rates according to the methodology described in section *vi*). Pre- and Post- significance ratings were established and are represented in Table 12. Each score rating indicates the significance of the potential impacts and risks and is colour coded according to Table 11.

Table 11: Explanation of colour indicator

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

To avoid replication of information, only the mitigation type will be summarised. The detailed mitigation measures are found in section B to this report.



Table 12: Potential environmental impacts and the assessment thereof

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not	MITIGATION TYPE	SIGNIFICANCE
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, etcetc)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etcetc)		In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	mitigated	(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 through rehabilitation.	if mitigated
			Construction Phase			
		Air Quality	Construction &	45		18
	Dust generation		Operational Construction &		Control	
		Human Health	Operational	45		18



		Topography and Visual	Construction &	40		27
		Environment	Operational	40		21
		Surface Water quality	Construction &	32		24
			Operational	-		
	Hydrocarbon	Groundwater quality	Construction &	27	Control	18
	Contamination	, ,	Operational			
		Soil quality	Construction &	36		24
			Operational			
4 A		Soil quality	Construction &	24		24
1. Access and	Degradation of soil		Operational		Remedy	
hauling along roads i.e. during the	resources	Flora micro-ecosystems	Construction &	24		24
construction of			Operational			
roads	Erosion	Loss of fertile soil Micro-ecosystems	Construction &	45		30
Todao			Operational Construction &		Control	
				33		24
		Macro and Micro	Operational Construction &			
	Vagatation and habitat	organisms	Operational	65		36
	Vegetation and habitat loss	Organisms	Construction &		Remedy	
	1055	Fauna and Flora	Operational	65		36
		Wetland and Aquatic	Construction &			
	Sedimentation and	Ecology	Operational	45		27
	siltation of watercourses	200099	Construction &		Control	
	Situation of Watercours	Surface Water	Operational	45		36
		Surrounding noise	Construction &	32	Control	18
		Samounaing noise	3311001000011 00	J.L		



	Noise generation	quality	Operational			
	INDISE GEHERATION	quality	Operational			
		Wetland and Aquatic	Construction &	50		18
	Alteration of drainage	Ecology	Operational		Remedy	
	patterns	Surface Water quality	Construction &	50		24
		Carrage Water quality	Operational	30		24
		Wetland and Aquatic	Construction &	33		24
	Destruction of upstream	Ecology	Operational	33		24
	tributaries and reduction	Downstream water	Construction &	44	Domody	0.4
	in water in the	users	Operational	44	Remedy	24
	catchment	0 ()11 ()11	Construction &	40		0.1
		Surface Water quality	Operational	40		24
	Water usage for dust	Wastage of water	Construction &	0.5	•	40
	suppression	resource	Operational	35	Control	18
	Influx of alien invasive	Fauna and Flora micro		65	0	40
	vegetation	and macro ecosystems	Construction		Control	40
	CO aminaiana	Air Ovality	Construction &	50	Control	12
	CO ₂ emissions	Air Quality	Operational	50	Control	12
		Air Quality	Construction	45	•	32
	Fugitive dust generation	Visual Environment	Construction	55	Control	32
	Alteration of the visual					
	environment and	Topography and Visual	Construction	55	Remedy	36
	topography	Environment	338 404011			
	ιοροφιαριίγ		Construction &		Remedy	
		Soil quality		45		24
			Operational			



	Degradation of soil resources	Flora micro-ecosystems	Construction & Operational	45		24
	Vegetation and habitat	Macro and Micro organisms	Construction & Operational		Remedy	36
	loss	Fauna and Flora	Construction & Operational	70	Remedy	36
	Destruction of Wetlands	Wetlands and Aquatic Ecology	Construction & Operational	65	Avoid	36
	Hydrocarbon Contamination	Surface Water quality	Construction & Operational	50		32
2. Site clearing and topsoil stripping for		Groundwater quality	Construction & Operational	36	Control	24
lay down area and all related mining		Soil quality	Construction & Operational	45		32
infrastructure	Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	50	Control	32
	siltation of watercourses	Surface Water	Construction & Operational	55		32
		Groundwater quality	Construction & Operational	45		24
	Water level reduction and contamination	Downstream water users	Construction & Operational	50	Control	24
		Surface Water quality	Construction & Operational	45		24



	Noise generation	Surrounding noise	Construction &	50	Control	24
	Noise generation	quality	Operational	30	Control	24
	Destruction of graves	Loss of heritage	Construction &	65	Avoid	39
	Book double of gravos	resources	Operational		717014	00
	Degradation of cultural	Loss of heritage	Construction &			
	significance heritage	resources	Operational	65	Avoid	39
	sites					
		Loss of fertile soil	Construction &	70		24
	Erosion		Operational		Control	
		Micro-ecosystems	Construction &	70		24
	CO ₂ emissions	, , , , , , , , , , , , , , , , , , , ,	Operational			
		Air Quality	Construction &	44	Control	12
		·	Operational			
		Wetland and Aquatic	Construction &	70	Remedy	36
	Alteration of drainage	Ecology	Operational			
	patterns	Surface Water quality	Construction &	70	,	36
			Operational			
	Influx of alien invasive	Fauna and Flora micro	Construction	60	Control	36
	vegetation	and macro ecosystems				
3. Weigh bridge	Hydrocarbon	Surface Water quality	Operational	55	Control	12
o. Heigh bridge	Contamination	Groundwater quality	Operational	24	Johnson	12
	Medical Waste	Human Health	Construction &	44	Control	27
	generation	numan nealth	Operational	44	Control	21
4. Onsite Clinic	4. Onsite Clinic Electricity usage	CO ₂ emissions	Operational	50	Control	21
	Domestic water usage	Wastage of water	Operational	30	Avoid	21



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resource Fugitive dust generation 24 Air Quality Construction 40 Control Topography and visual Topography and Visual Construction 55 Remedy 21 alteration Environment

	Influx of alien invasive	Fauna and Flora micro	Construction &	60	Control	27
	vegetation	and macro ecosystems	Operational		Control	
	Noise generation	Surrounding noise	Construction &	30	Control	18
5. Mining offices i.e.	140130 generation	quality	Operational		Control	
operation of training		Visual Environment	Construction &	55		36
centres, offices and		Visual Environment	Operational			
kitchen facilities	General waste	Soils quality due to	Construction &	50	Control	28
	generation & Littering	leachates	Operational	30	Control	20
		Surface Water quality	Construction &	27		28
		due to leachates	Operational	ΔI		20
	Electricity usage	CO ₂ emissions	Operational	40	Control	21
	Domestic water usage	Wastage of water	Operational	40	Avoid	21
	Domestic water usage	resource	Operational			21
		Loss of fertile soil	Construction &	60		30
	Erosion	LOSS OF TELLIF SOIL	Operational	00	Control	30
6. Storm water runoff	Liosion	Micro-ecosystems	Construction &	60	Control	30
management		Wildio-ecosystems	Operational	00		30
features		Macro and Micro	Construction &	50		27
icatures	Vegetation and habitat	organisms	Operational	30	Remedy	21
	loss	Fauna and Flora	Construction &	50	Remedy	27
		i auria ariu i iora	Operational			21
		260		agament Assistance (Dt.) Ltd.		



		Wetland and Aquatic	Construction &	70		36
	Sedimentation and	Ecology	Operational	70	Control	30
	siltation of watercourses	Surface Water	Construction &	70	Control	36
		Surface Water	Operational	70		30
		Surface Water quality Construction &	70		18	
		Surface Water quality	Operational	70		10
	Hydrocarbon	Groundwater quality	Construction &	56	Control	14
	Contamination	Groundwater quanty	Operational	30	Control	17
		Soil quality	Construction &	70		18
		Con quanty	Operational	70		10
		Wetland and Aquatic	Construction &	70		33
	Alteration of drainage	Ecology	Operational		Remedy	
	patterns	Surface Water quality	Construction &	60	,	33
			Operational			
7. Water storage	Improper water storage	Wastage of water resource	Operational	44	Avoid	21
facilities	management	Water contamination	Operational	52		16
	Ocatonic tion of water	Wetlands and Aquatic Ecology	Operational	60		16
	Contamination of water resources	Surface Water quality	Operational	75	Avoid	16
8. Pollution Control		Groundwater quality	Operational	75		16
Dams (PCD's) i.e. Construction and	Fugitive dust generation	Air Quality	Construction	30	Control	12
operation	Hydrocarbon Contamination i.e.	Surface Water quality	Construction & Operational	55	Control	21
	Usage of diesel operating pumps	Groundwater quality	Construction & Operational	33		11
	Smell nuisance	Human health and safety environment	Construction & Operational	55	Avoid	27



			Construction			
		Surface Water quality	Construction & Operational	70		33
	Hydrocarbon Contamination	Groundwater quality	Construction &	70	Control	22
	Contamination		Operational Construction &			
		Soil quality	Operational	70		33
	Degradation of soil	Soil quality	Construction & Operational	55	Remedy	33
	resources	Fauna & Flora micro- ecosystems	Construction & Operational	65	,	33
		Wetlands and Aquatic Ecology	Construction & Operational	70		33
9.Stores, workshops &wash bays	Contamination of water resources	Surface Water quality	Construction & Operational	70	Avoid	33
GWasii Days		Groundwater quality	Construction & Operational	70		22
	CO₂ emissions & Release of noxious gasses	Air Quality	Construction & Operational	45	Control	27
	Chemical Fires	Human health and safety environment	Construction & Operational	52	Avoid	24
		Loss of ecosystems	Construction & Operational	65		30
		Damage to property	Construction & Operational	56		33
	Noise generation	Surrounding noise quality	Construction & Operational	30	Control	18
	Degradation of soil	Soil quality	Construction & Operational	55	Remedy	33
10. Ablutions &	resources	Flora micro-ecosystems	Construction & Operational	55		33
change house with sewage treatment		Wetlands and Aquatic Ecology	Construction & Operational	70		33
plant	Contamination of water resources	Surface Water quality	Construction & Operational	70	Avoid	33
		Groundwater quality	Construction & Operational	56		22



	Smell nuisance	Human health and safety environment	Construction & Operational	60	Avoid	24
		Surface Water quality	Construction & Operational	70		33
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	70	Control	22
		Soil quality	Construction & Operational	55		33
	Degradation of soil	Soil quality	Construction & Operational	55		33
	resources	Flora micro-ecosystems	Construction & Operational	65	Remedy	33
		Wetlands and Aquatic Ecology	Construction & Operational	70	Avoid	33
11. Fuel operating power generators	Contamination of water resources	Surface Water quality	Construction & Operational	70		33
power generators		Groundwater quality	Construction & Operational	56		22
	CO ₂ emissions & Release of noxious gasses	Air Quality	Construction & Operational	45	Control	27
	_	Human health and safety environment	Construction & Operational	65	Avoid	24
	Chemical Fires	Loss of ecosystems	Construction & Operational	65		20
		Damage to property	Construction & Operational	70		24
	Noise generation	Surrounding noise quality	Construction & Operational	30	Control	18
	Electricity usage	CO ₂ emissions	Construction & Operational	45	Control	21
12. Lighting	Light pollution	Disruption in ecosystem especially nocturnal fauna species	Construction & Operational	27	Control	7



		Air Ourlit	Construction &			22
	Emission of noxious	Air Quality	Operational	65	Avoid	33
	fumes	Human Helath	Construction &	50	Avoiu	24
		Tramair Foldar	Operational			
		Surface Water quality	Construction & Operational	70		33
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	70	Control	22
		Soil quality	Construction & Operational	60		33
	Degradation of soil	Soil quality	Construction & Operational	55	Damadu	33
	resources	Flora micro-ecosystems	Construction & Operational	65	Remedy	22
	Contamination of water resources	Wetlands and Aquatic Ecology	Construction & Operational	70	Avoid	33
13. Fuel storage		Surface Water quality	Construction & Operational	70		33
		Groundwater quality	Construction & Operational	56		22
	Chemical Fires	Human health and safety environment	Construction & Operational	65		24
		Loss of ecosystems	Construction & Operational	65	Avoid	20
		Damage to property	Construction & Operational	70		24
	Loss of farm labour	Socio-economic	Construction & Operational	50	Control	32
14. Employment of	Population Influx – Pressure on Resources	Socio-economic	Construction & Operational	50	Control	32
workers and procurement of	Population Influx – Social Pathologies	Socio-economic	Construction & Operational	50	Control	32
construction materials.	Population Influx – Community Conflict	Socio-economic	Construction & Operational	65	Control	32
materials.	Health and Safety of employees	Human health and safety environment	Construction & Operational	55	Control	33
	Job Creation and Skills Training	Socio-economic	Construction & Operational	24	Control	24



	Job Creation (Multiplier affect) and Population Influx	Socio-economic	Construction & Operational	35	Control	24
		Surface Water quality	Construction & Operational	50		18
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	50	Control	12
		Soil quality	Construction & Operational	50		18
15. Transport of		Air Quality	Construction & Operational	40		24
construction material, mobile	Dust generation	Human Health	Construction & Operational	50	Control	24
plant and equipment to the site		Topography and Visual Environment	Construction & Operational	50		24
10 1110 0110	Erosion	Loss of fertile soil	Construction & Operational	45	Control	24
		Micro-ecosystems	Construction & Operational	55		24
	CO₂ emissions	Air Quality	Construction & Operational	30	Control	20
	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	Construction & Operational	60	Control	24
		Surface Water quality	Construction & Operational	45		27
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	45	Control	18
		Soil quality	Construction & Operational	45		18
		Groundwater quality	Construction & Operational	60		27
16. Use of existing drilled / new	Water level reduction	Downstream water users	Construction & Operational	60		24
boreholes	and contamination	Surface Water quality	Construction & Operational	60	Control	27



			Operational Phase			
	Loss of farm labour	Socio-economic	Construction & Operational	55	Control	24
	Population Influx – Pressure on Resources	Socio-economic	Construction & Operational	50	Control	30
17. Employment of	Population Influx – Social Pathologies	Socio-economic	Construction & Operational	40	Control	24
workers	Population Influx – Community Conflict	Socio-economic	Construction & Operational	65	Control	24
	Health and Safety of employees	Human health and safety environment	Construction & Operational	55	Control	33
	Job Creation and Skills Training	Socio-economic	Construction & Operational	25	Control	25
	Dust generation	Air Quality	Construction	60	Control	27
	Dust generation	Visual Environment	Construction	50		21
	Alteration of the visual environment and topography	Topography and Visual Environment	Construction	50	Remedy	36
	Degradation of soil resources	Soil quality	Construction & Operational	50	Remedy	24
18.Topsoil and		Flora micro-ecosystems	Construction & Operational	50		30
subsoil stripping &	Vegetation and habitat	Macro and Micro organisms	Construction & Operational	85	Remedy	55
stockpiling for	loss	Fauna and Flora	Construction & Operational	85	Kemeuy	55
	Destruction of Wetlands	Wetlands and Aquatic Ecology	Construction & Operational	75	Avoid	40
		Surface Water quality	Construction & Operational	70		36
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	70	Control	24
		Wetlands and Aquatic Ecology	Construction & Operational	70		36
	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	Construction & Operational	60	Control	30



		Surface Water quality	Construction &	70		36
		Surface vivaler quality	Operational			30
		Groundwater quality	Construction & Operational	60		27
	Water level reduction and contamination	Downstream water users	Construction & Operational	60	Control	18
		Surface Water quality	Construction & Operational	65		36
	Noise generation	Surrounding noise quality	Construction & Operational	55	Control	27
	Destruction of graves	Loss of heritage resources	Construction & Operational	65	Avoid	36
	Degradation of cultural significance heritage sites	Loss of heritage resources	Construction & Operational	65	Avoid	36
	Erosion	Loss of fertile soil	Construction & Operational	55	Control	33
	LIOSIOII	Micro-ecosystems	Construction & Operational	70	Control	33
	CO₂ emissions	Air Quality	Construction & Operational	45	Control	28
	Alteration of drainage	Wetland and Aquatic Ecology	Construction & Operational	75	Remedy	33
	patterns	Surface Water quality	Construction & Operational	80	Kemeuy	48
	Destruction of upstream	Wetland and Aquatic Ecology	Construction & Operational	65		27
	tributaries and reduction in water in the	Downstream water users	Construction & Operational	65	Remedy	18
	catchment	Surface Water quality	Construction & Operational	70		36
	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Construction & Operational	60	Control	36
19.Opencast mining	Hydrocarbon	Surface Water quality	Construction & Operational	70	Control	27
excavations	Contamination	Groundwater quality	Construction & Operational	70	Control	36



	 	0			
	Soil quality	Construction & Operational	65		27
	Air Quality	Construction & Operational	60		40
Dust generation	Human Health	Construction & Operational	55	Control	36
	Topography and Visual Environment	Construction & Operational	60		40
	Environment	Construction &			
Degradation of soil	Soil quality	Operational	60	Remedy	27
resources	Flora micro-ecosystems	Construction & Operational	70	Remedy	55
Fracion	Loss of fertile soil	Construction & Operational	70	Control	33
Erosion	Micro-ecosystems	Construction & Operational	65	Control	44
Vegetation and habitat	Macro and Micro organisms	Construction & Operational	85	D de	55
loss	Fauna and Flora	Construction & Operational	85	Remedy	55
Noise generation	Surrounding noise quality	Construction & Operational	60	Control	27
CO₂ emissions	Air Quality	Construction & Operational	50	Control	28
	Wetlands and Aquatic Ecology	Construction & Operational	70		33
Contamination of water resources	Surface Water quality	Construction & Operational	70	Avoid	33
	Groundwater quality	Construction & Operational	70		33
Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33
siltation of watercourses	Surface Water quality	Construction & Operational	75	Control	48
Alteration of drainage	Wetland and Aquatic Ecology	Construction & Operational	75	Domodu	33
patterns	Surface Water quality	Construction & Operational	80	Remedy	60



	Destruction of upstream	Wetland and Aquatic Ecology	Construction & Operational	60		27
	tributaries and reduction in water in the	Downstream water users	Construction & Operational	65	Remedy	18
	catchment	Surface Water quality	Construction & Operational	65		44
	Alteration of the visual environment and topography	Topography and Visual Environment	Construction	80	Remedy	55
	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Construction & Operational	60	Control	36
		Air Quality	Construction & Operational	55		32
	Dust generation	Human Health	Construction & Operational	55	Control	36
		Topography and Visual Environment	Construction & Operational	45		32
	Degradation of soil	Soil quality	Construction & Operational	65	Remedy	27
	resources	Flora micro-ecosystems	Construction & Operational	70	Kemeuy	55
		Wetlands and Aquatic Ecology	Construction & Operational	70		27
20.Drilling & Blasting	Contamination of water resources	Surface Water quality	Construction & Operational	75	Avoid	33
		Groundwater quality	Construction & Operational	70		33
		Surface Water quality	Construction & Operational	70		44
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	70	Control	33
	Noise generation	Soil quality	Construction & Operational	65		27
		Surrounding noise quality	Construction & Operational	60	Control	30
	Damage to surrounding landowner properties	Socio-economic	Construction & Operational	65	Avoid	36



		Human health and	Construction &	60		20
		safety environment	Operational	00		36
		Surface Water quality	Construction & Operational	65		33
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	65	Control	33
		Soil quality	Construction & Operational	65		27
		Air Quality	Construction & Operational	60		36
	Dust generation	Human Health	Construction & Operational	70	Control	44
		Topography and Visual Environment	Construction & Operational	60		36
	Degradation of soil	Soil quality	Construction & Operational	60	Remedy	27
	resources	Flora micro-ecosystems	Construction & Operational	60	remedy	55
21. RoM & product	Erosion	Loss of fertile soil	Construction & Operational	70	Control	33
stockpiling	LIUSIOII	Micro-ecosystems	Construction & Operational	65		44
		Wetlands and Aquatic Ecology	Construction & Operational	70		33
	Contamination of water resources	Surface Water quality	Construction & Operational	70	Avoid	33
		Groundwater quality	Construction & Operational	70		33
	Vegetation and habitat	Macro and Micro organisms	Construction & Operational	70	Remedy	55
	loss	Fauna and Flora	Construction & Operational	70	Remeuy	55
	Noise generation	Surrounding noise quality	Construction & Operational	50	Control	21
	CO₂ emissions	Air Quality	Construction & Operational	50	Control	28
	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33



		Surface Water quality	Construction & Operational	70		33
	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Construction & Operational	60	Control	36
		Air Quality	Construction & Operational	60		36
	Dust generation	Human Health	Construction & Operational	70	Control	36
		Topography and Visual Environment	Construction & Operational	60		36
	Degradation of soil	Soil quality	Construction & Operational	70	Remedy	27
	resources	Flora micro-ecosystems	Construction & Operational	70	Remedy	55
	Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33
	siltation of watercourses	Surface Water quality	Construction & Operational	70		33
22. Residue		Wetlands and Aquatic Ecology	Construction & Operational	70		33
stockpiles	Contamination of water resources	Surface Water quality	Construction & Operational	70	Avoid	33
		Groundwater quality	Construction & Operational	70		33
	Vegetation and habitat	Macro and Micro organisms	Construction & Operational	70	Remedy	55
	loss	Fauna and Flora	Construction & Operational	70		55
	Alteration of the visual environment and topography	Topography and Visual Environment	Construction & Operational	55	Remedy	36
	Alteration of drainage	Wetland and Aquatic Ecology	Construction & Operational	75	Remedy	33
	patterns	Surface Water quality	Construction & Operational	80	Remedy	44
	Hazardous Leachate	Groundwater quality	Operational	75	Control	33



		Aquatic ecology	Operational	75		27
		Surface Water quality	Construction & Operational	65		21
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	65	Control	21
		Soil quality	Construction & Operational	65		21
		Air Quality	Construction & Operational	60		44
	Dust generation	Human Health	Construction & Operational	70	Control	36
		Topography and Visual Environment	Construction & Operational	60		36
	Degradation of soil	Soil quality	Construction & Operational	70		27
23. Screening Operations	resources	Flora micro-ecosystems	Construction & Operational	70		33
	CO₂ emissions	Air Quality	Construction & Operational	50	Control	28
		Wetlands and Aquatic Ecology	Construction & Operational	70	Avoid	33
	Contamination of water resources	Surface Water quality	Construction & Operational	75 		33
		Groundwater quality	Construction & Operational	75		22
	Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33
	siltation of watercourses	Surface Water quality	Construction & Operational	70		33
	Noise generation	Surrounding noise quality	Construction & Operational	55	Control	27
		Surface Water quality	Construction & Operational	70		27
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	60	Control	16
		Soil quality	Construction &	65		24



			Operational			
		Air Quality	Construction & Operational	50		40
24. Discard disposal	Dust generation	Human Health	Construction & Operational	65	Control	24
(backfilling of mining area)		Topography and Visual Environment	Construction & Operational	65		24
	Degradation of soil	Soil quality	Construction & Operational	70	Domodu	33
	resources	Flora micro-ecosystems	Construction & Operational	70	Remedy	44
	Erosion	Loss of fertile soil	Construction & Operational	70	Control	33
	Elosion	Micro-ecosystems	Construction & Operational	70	Control	36
		Wetlands and Aquatic Ecology	Construction & Operational	70	Avoid	27
	Contamination of water resources	Surface Water quality	Construction & Operational	70		33
		Groundwater quality	Construction & Operational	70		18
	Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33
	siltation of watercourses	Surface Water quality	Construction & Operational	70	Control	33
	Noise generation	Surrounding noise quality	Construction & Operational	55	Control	18
	Degradation of soil	Soil quality	Construction & Operational	55	Remedy	21
25. Waste	resources	Flora micro-ecosystems	Construction & Operational	55	Remeuy	27
generation, storage and disposal		Wetlands and Aquatic Ecology	Construction & Operational	65	Avoid	27
and disposal	Contamination of water resources	Surface Water quality	Construction & Operational	65		27
		Groundwater quality	Construction & Operational	65		18



		Surface water contamination	Construction & Operational	70		27
	Illegal dumping	Human health and safety environment	Construction & Operational	70	Avoid	27
		Soil Contamination	Construction & Operational	75		27
	Hazardous Leachate	Groundwater quality	Operational	70	Control	27
	Tiazardous Leachate	Aquatic ecology	Operational	75	Control	18
	Degradation of soil	Soil quality	Construction & Operational	40	Remedy	18
	resources	Flora micro-ecosystems	Construction & Operational	40	Kemeuy	18
26. Chemical Toilets		Wetlands and Aquatic Ecology	Construction & Operational	40		12
20. Chemical Tollets	Contamination of water resources	Surface Water quality	Construction & Operational	40	Avoid	24
		Groundwater quality	Construction & Operational	40		12
	Smell nuisance	Human health and safety environment	Construction & Operational	40	Avoid	24
		Surface Water quality	Construction & Operational	55		27
	Hydrocarbon Contamination	Groundwater quality	Construction & Operational	55	Control	27
		Soil quality	Construction & Operational	65		27
27. River crossings	Erosion	Loss of fertile soil	Construction & Operational	65	Control	36
21. River crossings	EIOSIOII	Micro-ecosystems	Construction & Operational	65	Control	36
	Water level reduction and contamination	Groundwater quality	Construction & Operational	60	Control	21
		Downstream water users	Construction & Operational	60		14
		Surface Water quality	Construction & Operational	60		21



		Wetlands and Aquatic	Construction &	60		27
		Ecology	Operational			ZI
	Contamination of water	Surface Water quality	Construction &	60	Avoid	27
	resources		Operational Construction &	00	-	
		Groundwater quality	Operational	60		27
		Wetland and Aquatic	Construction &	70		33
	Sedimentation and	Ecology	Operational	10	Control	00
	siltation of watercourses	Surface Water quality	Construction & Operational	70	Common	44
		Wetland and Aquatic	Construction &	75		33
	Alteration of drainage	Ecology	Operational		Remedy	00
	patterns	Surface Water quality	Construction & Operational	75	Romody	27
	CO₂ emissions	Air Quality	Construction & Operational	55	Control	45
		Groundwater quality	Construction & Operational	60		21
	Water level reduction	Downstream water	Construction &	60	Control	14
	and contamination	users	Operational	00	Control	14
		Surface Water quality	Construction & Operational	60		21
28. Water supply		Wastage of water	Construction &	60		27
(potable & process)	Improper water storage	resource	Operational	00	Avoid	Li
	management	Water contamination	Construction & Operational	70	Avoid	18
		Wetlands and Aquatic Ecology	Construction & Operational	70		14
	Contamination of water resources	Surface Water quality	Construction & Operational	60	Avoid	14
		Groundwater quality	Construction & Operational	48		9
	Hydrocarbon Contamination	Surface Water quality	Construction & Operational	60	Control	24
		Groundwater quality	Construction & Operational	55		24
		Soil quality	Construction & Operational	70		24



	Degradation of soil	Soil quality	Construction & Operational	55		24
29. Storage of fuel and lubricants in	resources	Flora micro-ecosystems	Construction & Operational	55	Remedy	24
temporary facilities		Wetlands and Aquatic Ecology	Construction & Operational	55		16
	Contamination of water resources	Surface Water quality	Construction & Operational	55	Avoid	24
		Groundwater quality	Construction & Operational	55		18
		Human health and safety environment	Construction & Operational	60	Avoid	24
	Chemical Fires	Loss of ecosystems	Construction & Operational	80		16
		Damage to property	Construction & Operational	80		16
	Hydrocarbon Contamination	Surface Water quality	Construction & Operational	65		24
		Groundwater quality	Construction & Operational	65	Control	27
		Soil quality	Construction & Operational	70		27
		Air Quality	Construction & Operational	60		36
30. Vehicular activity	Dust generation	Human Health	Construction & Operational	60	Control	36
on haul roads; and operation of mining		Topography and Visual Environment	Construction & Operational	60		45
equipment	Degradation of soil	Soil quality	Construction & Operational	70	Remedy	33
	resources	Flora micro-ecosystems	Construction & Operational	70		22
	Erosion	Loss of fertile soil	Construction & Operational	65	Control	33
	- 5.5	Micro-ecosystems	Construction & Operational	65		33
	CO ₂ emissions	Air Quality	Construction & Operational	50	Control	28



	Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33
	siltation of watercourses	Surface Water quality	Construction & Operational	70	Control	24
	Noise generation	Surrounding noise quality	Construction & Operational	60	Control	27
		Air Quality	Construction & Operational	55		27
31. Bulk transporting	Dust generation	Human Health	Construction & Operational	75	Control	27
of Ore to market on Public roads		Topography and Visual Environment	Construction & Operational	55		27
	CO₂ emissions	Air Quality	Construction & Operational	55	Control	28
	Pressure on public transport infrastructure	Socio-economic	Construction & Operational	65	Control	50
	Erosion	Loss of fertile soil	Construction & Operational	65	Control	27
		Micro-ecosystems	Construction & Operational	65	Control	36
	Improper water storage	Wastage of water resource	Construction & Operational	55	Avoid	27
	management	Water contamination	Construction & Operational	65	Avoid	27
		Wetlands and Aquatic Ecology	Construction & Operational	70		33
32. Water Management	Contamination of water resources	Surface Water quality	Construction & Operational	75	Avoid	27
		Groundwater quality	Construction & Operational	70		33
	Sedimentation and	Wetland and Aquatic Ecology	Construction & Operational	70	Control	33
silta	siltation of watercourses	Surface Water quality	Construction & Operational	70	Control	27
	Alteration of drainage	Wetland and Aquatic Ecology	Construction & Operational	75	Remedy	33
	patterns	Surface Water quality	Construction & Operational	75	Remeuy	36



		Groundwater quality	Construction & Operational	70		27
	Water level reduction and contamination	Downstream water users	Construction & Operational	70	Control	27
		Surface Water quality	Construction & Operational	70		21
	Destruction of upstream	Wetland and Aquatic Ecology	Construction & Operational	70		27
	tributaries and reduction in water in the	Downstream water users	Construction & Operational	70	Remedy	27
	catchment	Surface Water quality	Construction & Operational	70		27
	Erosion	Loss of fertile soil	Operational	70	Control	27
	LIOSIOII	Micro-ecosystems	Operational	70	Control	36
	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	Operational	70	Control	33
		Surface Water quality	Operational	70	Co	36
33. Rehabilitation of	Noise generation	Surrounding noise quality	Operational	50	Control	18
mining areas	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Operational	60	Control	24
	Degradation of soil	Soil quality	Operational	80	Remedy	24
	resources	Flora micro-ecosystems	Operational	80	Kemeuy	24
	Vegetation and habitat	Macro and Micro organisms	Operational	80	Remedy	30
	loss	Fauna and Flora	Operational	80	,	32
			Decommissioning			
35. Demolition /		Surface Water quality	Decommissioning	60	Control	24
removal of portable and related	Hydrocarbon Contamination	Groundwater quality	Decommissioning	60		8
infrastructure		Soil quality	Decommissioning	60		24



	ī	T				
		Air Quality	Decommissioning	45		24
	Dust generation	Human Health	Decommissioning	45	Control	24
		Topography and Visual Environment	Decommissioning	45		18
	Degradation of soil	Soil quality	Decommissioning	60	Remedy	18
	resources	Flora micro-ecosystems	Decommissioning	60	Kemeuy	18
	Erosion	Loss of fertile soil	Decommissioning	75	Control	24
	Liosion	Micro-ecosystems	Decommissioning	70	Control	24
	Noise generation	Surrounding noise quality	Decommissioning	45		18
	General waste	Soils quality due to leachates	Decommissioning	65	Control	24
	generation & Littering	Surface Water quality due to leachates	Decommissioning	65		24
		Surface Water quality	Decommissioning	55	Control	24
	Hydrocarbon Contamination	Groundwater quality	Decommissioning	55		8
		Soil quality	Decommissioning	55		24
		Air Quality	Decommissioning	45		24
36. Vehicular	Dust generation	Human Health	Decommissioning	45	Control	24
activity: removal of mobile plant /		Topography and Visual Environment	Decommissioning	45		24
equipment and vehicles	Erosion	Loss of fertile soil	Decommissioning	50	Control	24
	ETUSION	Micro-ecosystems	Decommissioning	50	Control	24
	CO₂ emissions Sedimentation and	Air Quality	Decommissioning	40	Control	12
		Wetland and Aquatic Ecology	Decommissioning	50	Control	12
	siltation of watercourses	Surface Water quality	Decommissioning	50	30.100	18



	Noise generation	Surrounding noise quality	Decommissioning	40	Control	18
		Air Quality	Decommissioning	45		24
	Dust generation	Human Health	Decommissioning	50	Control	24
		Topography and Visual Environment	Decommissioning	40		24
		Loss of fertile soil	Decommissioning	65		24
	Erosion	Micro-ecosystems	Decommissioning	60	Control	18
37. Rehabilitation of	Sedimentation and	Wetland and Aquatic Ecology	Decommissioning	65	Control	12
the lay down areas	siltation of watercourses	Surface Water quality	Decommissioning	75	000.	18
	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Decommissioning	65	Control	18
	Degradation of soil	Soil quality	Decommissioning	70	Remedy	18
	resources	Flora micro-ecosystems	Decommissioning	70	Kemeuy	18
	Vegetation and habitat	Macro and Micro organisms	Decommissioning	85	Remedy	32
	loss	Fauna and Flora	Decommissioning	75		24
		Surface Water quality	Decommissioning	55		24
	Hydrocarbon Contamination	Groundwater quality	Decommissioning	55	Control	8
		Soil quality	Decommissioning	60		24
38. Demolition of		Air Quality	Decommissioning	40		12
PCD's	Dust generation	Human Health	Decommissioning	40	Control	16
		Topography and Visual Environment	Decommissioning	40		16
	Degradation of soil	Soil quality	Decommissioning	70	Pomody	18
	resources	Flora micro-ecosystems	Decommissioning	70	Remedy	24



		Loss of fertile soil	Decommissioning	65		24
	Erosion	Micro-ecosystems			Control	18
		Wetlands and Aquatic Ecology	Decommissioning	60		24
	Contamination of water resources	Surface Water quality	Decommissioning	60	Avoid	24
		Groundwater quality	Decommissioning	60		16
	Noise generation	Surrounding noise quality	Decommissioning	30	Control	18
	General waste	Soils quality due to leachates	Decommissioning	60	Control	18
	generation & Littering	Surface Water quality due to leachates	Decommissioning	60	Control	18
		Surface Water quality	Decommissioning	55		24
	Hydrocarbon Contamination	Groundwater quality	Decommissioning	55	Control	16
		Soil quality	Decommissioning	70		24
	Dust generation	Air Quality	Decommissioning	40		12
		Human Health	Decommissioning	40	Control	24
		Topography and Visual Environment	Decommissioning	40		16
39. Demolition of	Degradation of soil	Soil quality	Decommissioning	70	Remedy	18
workshops, waste	resources	Flora micro-ecosystems	Decommissioning	75	Remeuy	18
storage facilities, fuel storage facilities	Erosion	Loss of fertile soil	Decommissioning	65	Control	24
etc.	ETUSION	Micro-ecosystems	Decommissioning	60	Control	18
	Out to reside a time of the state of the sta	Wetlands and Aquatic Ecology	Decommissioning	60		24
	Contamination of water resources	Surface Water quality	Decommissioning	60	Avoid	16
		Groundwater quality	Decommissioning	65		16



		Nois	se generation	Surrounding quality			Decommi	ssioning		40			Control		18	
		Ge	neral waste	Soils quality leachate			Decommi	ssioning		70				24		
		genera	ation & Littering	Surface Wate due to lead			Decommi	ssioning		65		Control			24	
The	supporting	impact	assessment	conducted	by	the	EAP	must	be	attached	as	an	appendix,	marked	Appendix	R.

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 X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Appendix E: Air Quality Impact Assessment	 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. Summary of recommendations and monitoring requirements: A fugitive dust management plan to be developed prior to the commencement of any onsite activities. Dust control measures need to be assessed in detail and incorporated into the design. The plan must include appropriate mitigation measures as described in Table 6-1 	X	Part B: EMPr



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	for all dust emission sources.		
	The plan should be implemented once operations commence.		
	Designated areas for the storage of overburden should be considered and		
	incorporated into the design.		
	All main hauling roads should be treated for dust suppression to maintain at least		
	65% emission reduction efficiency.		
	Regular cleaning and maintenance of hauling routes.		
	Immediate clean-up of any spillage.		
	All material that is being transported should be covered during transport (where		
	possible).		
	Control the number of trucks on the road, weight of trucks and the travelling		
	speed.		
	Conduct regular maintenance and checks for haul road surfaces.		
	Implement strict vehicle speed limits.		
	Conduct regular maintenance and quality checks (engines/tires) for all heavy		
	mobile equipment/trucks.		
	Consider use of cleaner fuel types and fuel efficient vehicles/mobile		
	equipment/trucks.		
	From a terrestrial ecological perspective, the proposed development has been rated		Part A: consideration for final site
2. Appendix G:	as follows:	Х	layout
Biodiversity Impact			Part B: EMPr
Assessment	The following could proceed if all mitigation measure are diligently implemented with		- · · · ·



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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
- Phase 1: Klarinet Koppie mining near the discontinued Clarinet Mine could proceed
- Phase 3: Tubatse Koppie mining could proceed but with caution
- 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.



3. Appendix H : Avifauna Survey and Impact Assessment	 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: 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 powerlines along these connecting roads, or better still, route them underground. 	X	Part B: EMPr
4. Appendix J : Bat Survey	 The focus for mitigation measures in relation to vegetation removal/habitat degradation would be: 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 were 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. 	X	Part B: EMPr



	The focus for mitigation measures in relation to light and noise pollution would be; 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. 		
5. Appendix M : Geo- hydrological Impact Assessment	 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, CI, NO3, SO4, HCO3, NH4, PO4,); Major cations (K, Na, Mg, Ca, NH4,); 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 	X	Part B: EMPr



	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.		
6. Appendix L : Hydrological Assessment	 and analysis (major and trace elements) of pumped water. The following summarises the recommendations as a result from the Hydrological Assessment: It is recommended that an Automatic Weather Station be installed at the site. 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. Stream crossings and associated bridge and culvert designs have not been considered in this assessment but in principle, these crossing need to be 	X	Part A: consideration for final site layout Part B: EMPr
	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 ove 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		



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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.

- 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.
- 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 1.097km2. This accounts for 0.022 million



	m3 of MAR that will be contained by the site (0.15% of quaternary catchment B41J MAR) Based on the model results, there seems to be an excess of approximately 22 527m3/month and 8 065m3/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.		
7. Appendix O : Heritage Impact Assessment	 Conditions for inclusion 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. 	X	Part A: consideration for final site layout Part B: EMPr



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	 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). 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. 		
8. Appendix F : Noise Impact Assessment	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.	X	Part B: EMPr



	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. 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 		
9. Appendix K : Soil Impact Assessment	The results of the Impact Assessment for the proposed mine on Portions 8, 22 Farm Kennedy's Vale 361KT & 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. Implementation and management of proposed mitigation measures will minimize loss of topsoil, prevent contamination of topsoil and stockpiled soil and	X	Part B: EMPr



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prevent overall soil erosion.

It is recommended that the proposed project be approved subjected to the mitigation measures stipulated in the Impact Assessment and Environmental Management Programme

The following mitigation measures are recommended to prevent the change of soil's physical, chemical and biological properties due to loss of topsoil:

- due to erosion, stockpiling, mixing of deep and surface soils during handling, stockpiling and subsequent placement;
- Implement live placement of soil where possible, improve organic status of soils, maintain fertility levels and curb topsoil loss.
- Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion

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.

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.

When stockpiled soils have been replaced during rehabilitation, the soil fertility should



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be assessed to determine the level of fertilisation required to sustain normal plant growth.

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.

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.

The soil profile should not be built up by using a repeated tipping and levelling action to increase the soil depth.

Proper water control measures should be implemented to ensure a free draining rehabilitated landscape.

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.

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. A scientific assessment should be conducted to assess what grass species occur at baseline conditions in close proximity to the stockpile area.		
10. Appendix N : Human Health Impact Assessment	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 implementation; and 3) make adjustments in order to address unanticipated effects. As a result, an M&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. 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	X	Part B: EMPr



	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.		
11. Appendix P : Traffic Impact Assessment	The findings of the traffic impact assessment for proposed BCR Chrome Mine, the Spitsvale Project 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 development traffic and also to ensure traffic safety principles are adhered to. 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.	X	Part B: EMPr
12. Appendix S : Mine Rehabilitation, closure, and Liability plan	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	X	Final EMPr



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the infrastructure were calculated to determine the volume or surface requiring rehabilitation or demolition. 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 90 452 381.83 (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 98% of the liability cost. The physical rehabilitation (demolition and removal of structures) amounts to 2% (**R 1 636 330.71**) of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of both components.

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 Project (including mining of phase 2 and 3 and the associated infrastructure)



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	was calculated as R106 671 605.22 (including P&G, contingency and excluding VAT).		
	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. Appendix T : Public Participation Report	To be finalised after the completion of the required 30 days PPP.	X	Final EMPr

(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 S** provides for addressing 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.

Although the procedures stipulated in GN R982 was not followed during the initial Scoping phase of the proposed activities, in Environmental Management Assistance (Pty) Ltd's professional opinion, 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, this document 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 S) be implemented;
- A annual rehabilitation 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 EIR and EMPr; and
- That the recommended mitigation measures must be strictly implemented and compliance be 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.



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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 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	Vegetation and habitat loss	65	36
construction of roads			
	Vegetation and habitat loss	70	36
2. Site clearing and topsoil	Destruction of Wetlands	65	36
stripping for lay down area	Destruction of graves	65	39
and all related mining	Degradation of cultural significance heritage sites	65	39
infrastructure	Erosion	70	24
	Alteration of drainage patterns	70	36
6. Storm water runoff	Sedimentation and siltation of watercourses	70	33
management features	Hydrocarbon Contamination	70	18
-	Alteration of drainage patterns	70	33
8. Pollution Control Dams (PCD's) i.e. Construction and operation	Contamination of water resources	75	16
•	Hydrocarbon Contamination	70	33
9.Stores, workshops &wash	Degradation of soil resources	65	33
bays	Contamination of water resources	70	33
	Chemical Fires	65	22
10. Ablutions & change house with mobile sewage treatment plant	Contamination of water resources	70	33
	Hydrocarbon Contamination	70	33
11. Fuel operating power	Degradation of soil resources	65	33
generators	Contamination of water resources	70	33
	Chemical Fires	65	24
13. Fuel storage	Emission of noxious fumes	65	33
10.1 doi otorago	Hydrocarbon Contamination	70	33



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	Degradation of soil resources	64	22
	Contamination of water resources	70	33
	Chemical Fires	65	24
14. Employment of workers			
and procurement of	Population Influx – Community	65	32
construction materials.	Conflict		
	Operatio	nal Phase	
17. Employment of workers	Population Influx – Community Conflict	65	32
	Vegetation and habitat loss	85	55
	Destruction of Wetlands	75	40
	Hydrocarbon Contamination	70	36
	Sedimentation and siltation of watercourses	70	36
18.Topsoil and subsoil	Water level reduction and contamination	65	36
stripping & stockpiling for	Destruction of graves	65	36
mining operation area	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
	Hydrocarbon Contamination	70	27
	Degradation of soil resources	70	55
	Erosion	70	44
	Vegetation and habitat loss	85	55
19.Opencast mining	Contamination of water resource	70	33
excavations	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
	Degradation of soil resources	70	55
20.Drilling & Blasting	Contamination of water resource	70	33
	Hydrocarbon contamination	70	44
	Damage to surrounding landowner properties	65	36
21. RoM & product	Hydrocarbon contamination	65	33
stockpiling	Dust generation	70	44



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	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
	Dust generation	70	36
	Degradation f soil resources	70	55
	Sedimentation and siltation of watercourses	70	33
22. Residue stockpiles	Contamination of water resources	70	33
	Vegetation and habitat loss	70	55
	Alteration of drainage patterns	80	44
	Hazardous Leachate	75	33
	Hydrocarbon contamination	65	21
	Dust generation	70	36
23. Screening Operations	Degradation of soil resources	70	33
_o, co.co.m.g operations	Contamination of water resources	70	33
	Sedimentation and siltation of watercourses	70	33
	Hydrocarbon contamination	70	27
	Dust generation	65	24
24. Discard disposal	Degradation of soil resources	70	44
(backfilling of mining area)	Erosion	70	36
(**************************************	Contamination of water resource	70	33
	Sedimentation and siltation of watercourses	70	33
25. Waste generation,	Contamination of water resources	65	27
storage, and disposal	Illegal dumping	75	27
	Hazardous Leachate	75	27
	Hydrocarbon contamination	65	27
07 Diversity	Erosion	65	36
27. River crossings	Sedimentation and siltation of watercourses	70	44
	Alteration of drainage patterns	75	33
28. Water supply (potable &	Improper water storage management	70	18
process)	Contamination of water resource	70	14
29. Storage of fuel and	Hydrocarbon contamination	70	24
lubricants in temporary	Chemical fires	80	16



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facilities			
	Hydrocarbon contamination	65	27
30. Vehicular activity on haul	Degradation of soil resources	70	33
roads; and operation of	Erosion	65	33
mining equipment	Sedimentation and siltation of watercourses	70	33
31. Bulk transporting of Ore	Dust generation	75	27
to market on Public	Pressure on public transport infrastructure	65	50
	Erosion	65	36
	Improper water storage management	65	27
	Contamination of water resources	70	33
32. Water Management	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
	Erosion	70	36
33. Rehabilitation of mining	Sedimentation and siltation of watercourses	70	36
areas	Degradation of soil resources	80	24
	Vegetation and habitat loss	80	30
	Decommiss	ioning Phase	
35. Demolition / removal of	Erosion	75	24
portable and related infrastructure	General Waste generation & Littering	65	24
	Erosion	65	24
37. Rehabilitation of the lay	Sedimentation and siltation of watercourses	75	18
down areas	Influx of alien invasive vegetation	65	18
	Degradation of soil resources	70	18
	Vegetation and habitat loss	85	32
38. Demolition of PCD's	Degradation of soil resources	70	24
OO. DEMORRION OF FOD 5	Erosion	65	24
	Hydrocarbon contamination	70	24
39. Demolition of workshops,	Degradation of soil resources	70	18
waste storage facilities, fuel	Erosion	65	24
storage facilities etc.	Contamination of water resources	70	16
	General waste generation & Littering	65	24



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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 Project, the impacts can be mitigated to a *medium/low negative significant* impact or avoided all together.

Resulting from the specialist studies as well as the assessment of possible impacts, the following areas of concern would require attention throughout the life cycle of the proposed Spitsvale Project:

- Terrestrial ecological status of the areas affected by the proposed mining activities as the Spitsvale Project 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 O;
- Storm water management and erosion prevention;
- 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 project; 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.

At the time of finalising this report the following infrastructures did not form part of the site layout:

- Storm water infrastructure;
- Location of PCD's; and
- Detailed infrastructure associated to the Tubatse lay down area.

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It is therefore recommended that before authorising the activity a detailed site layout plan be submitted indicating the details of all infrastructure associated to the proposed mining development.

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 Project (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 Project

Positive Implications	Negative Implication and risk
Job creation	Loss of vegetation and habitat
Positive contribution to social economic development	Degradation of soil resources
Contribute to the national GDP	Degradation of ambient air quality due to dust generation
Open communication with the I&AP of environmental	Noise generation
findings and performance will contribute the learning	Hydrocarbon contamination and pollution
opportunity of the surrounding communities.	Erosion
	Contamination of water resources
Implementing recommendations made in Appendix N will result	Sedimentation and siltation of watercourses
in the following positive implications:	Alteration of drainage patterns
Possibly stimulate the increase in household income	Influx of alien invasive vegetation
Increase the ability to afford healthier food and associated	Alteration of the visual environment and topography
improved nutritional and health status	Destruction or degradation of significant heritage sites and
Raise awareness within the community on all associated	graves
human health risks.	Waste generation (hazardous and general waste)
Implementing the recommendations made in Appendix G	Health and safety of employees
regarding the management of alien invasive species may result	Community conflict caused by population influx
in the following positive outcomes:	
Promote the knowledge and need for the eradication of	
alien species within the surrounding communities	

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



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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 chromite 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;
- Reserve 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.



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• 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 S**, 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 where considered regarding the properties proposed for the activities.



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The site layout (**Appendix C**) indicates existing infrastructure resulting from the prospecting phase of the Spitsvale Project 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 has been carefully considered with regards to sensitive environmental and social receptors.

At the time of finalising this report for the PPP the following infrastructures did not form part of the site layout:

- Storm water infrastructure;
- Location of PCD's; and
- Detailed infrastructure associated to the Tubatse lay down area.

It is therefore recommended that before authorising the activity a detailed site layout plan be submitted indicating the details of all infrastructure associated to the proposed mining development.

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)

This document has been finalised for the required 30 days PPP as required by GNR 982 and includes the Spitsvale Mine Rehabilitation, Closure and Liability plan developed according to GNR 1147. This report will be finalised to include any comments received from the registered I&AP.

In addition to the requirements to review the EIR and EMPr 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 EIR and EMPr;
- The Spitsvale Mine Rehabilitation, Closure and Liability plan attached as Appendix S 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;
- A final site layout detailing all infrastructure (with specific reference to the storm water management infrastructure, the PCD's designs, and the river crossings) associated to current and future mining activities must be provided to the competent authorities for approval before any activities commence;
- Conditions stipulated in the final EMPr and closure plan be adhered with;
- Conditions stipulated in all other permits or authorisations should be implemented; and
- All recommendations made in the EIR and specialist studies be implemented and considered in the finalisation
 of the site lay out plan and operational design of the proposed mining development.



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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 S**) the following assumptions, uncertainties, and gaps were highlighted:

- The areas and components included in the current assessment were supplied to EMA by BCR and the EIA
 specialist reports at the time of this report. These areas were assumed to be all that BCR will be liable for and no
 investigation was conducted to determine whether BCR is responsible for any additional areas.
- 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 onsite 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.
- BCR Minerals 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.



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- 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 had 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. This revised report must then be subjected to the stipulated 30 days PPP as required in the 2014 EIA regulations. Any comments or concerns received after the 30 days PPP period should be 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 EAP 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 should 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:

- The revised EIR and EMPr, together with the finalised Spitsvale Mine Rehabilitation, closure and liability plan as regulated under GN R. 1142, be subjected to the required 30 days PPP as regulated by the 2014 EIA regulations;
- All comments and concerns raised by the registered I&AP be considered and incorporated into the final EIR and EMPr
- Conditions stipulated in the final EMPr and closure plan be adhered with;
- Conditions stipulated in all other permits or authorisations should be implemented; and



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All recommendations made in the EIR and specialist studies be implemented and considered in the finalisation

of the site lay out 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 determine 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 S**.

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 implementation of the plan; and

Must be measurable and auditable.



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As explained in **Appendix S**, 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 authorisation the final annual rehabilitation plan will have to be developed in detail.

Final rehabilitation, decommissioning and closure plan

GNR 1147 list 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 relinguishment 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 addresses the requirements stipulated above. However, as soon as the final site layout detailing all infrastructures associated to the mining activities have been defined and finalised (**Appendix S**), it is recommended that this report be reviewed.

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 has been achieved.

Although the potential impacts associated to the proposed mining activities has been identified throughout the EIA process, the identification of latent risks without the initiation of full mining activity and monitoring of the implementation of 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 S** 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.



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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 U.

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 S**), 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 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 90 452 381.83 (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 98% of the liability cost. The physical rehabilitation (demolition and removal of structures) amounts to 2% (**R 1 636 330.71**) of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of both components.

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 Project (including mining of phase 2 and 3 and the associated infrastructure) was calculated as R106 671 605.22 (including P&G, contingency and excluding VAT).

The increase in biophysical costs can be attributed to the addition of two opencast pits, with their associated infrastructure, in the future.



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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 90% 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 S.

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 S.

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 Technica

Competence Report or Prospecting Work Programme as the case may be

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

There have been a number of deviations and additional information added compared to the initial accepted Scoping report. The following sections will highlight the deviations in detail.

Appointment of EAP

During the initial Scoping phase of the EIA process as stipulated by GN R. 982, no independent EAP was appointed by the applicant. Although the regulations provides for the report to be compiled by in house EAP (section 13 (2)), it still requires to be reviewed by an independent EAP before the commencement of the public participation process.

Environmental Management Assistance (Pty) Ltd (EMA) was appointed by the applicant in September 2015. The acceptance letter of the submitted Scoping report was received on the 20th of October 2015.

Listed and specified activities

GN R. 983 to GN R. 985 lists a number of activities that requires either a Basic Impact Assessment (BAR) or a Scoping & EIA process to be followed. Additional listed activities were included in the EIA and EMPr that were not included in the approved Scoping report.

The following listed activities, according to Listing notice 3 (GN R. 985) were assessed as part of this EIR and EMPr report:

- Listed activity 4: "The development of a road wider than 4 metres with a reserve less than 13,5 metres. (a) In Free State, Limpopo, Mpumalanga and Northern Cape provinces: ii. Outside urban areas, in: (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
- <u>Listed activity 10</u>: "The development of facilities or infrastructure for the storage, or storage and handling of a
 dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80
 cubic metres. (e) In Limpopo: i. All areas."
- <u>Listed activity 12</u>: "The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (a) In Eastern Cape Free State, Gauteng, Limpopo, North West and Western Cape provinces: i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in



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the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans"

Also note that listed activity 12, as listed in GNR 984, are excluded as no railways will be constructed as part of the proposed mining activity.

Determination of the final site layout

As the Scoping report pointed out, alternatives were being considered and that the inputs from the I&AP's and specialist studies the layout plan may still change.

At the time of providing this report to the authority I&AP for the required 30 days PPP, the following infrastructures does not form part of the site layout:

- Storm water infrastructure;
- Location of PDD; and
- Detailed infrastructure associated to the Tubatse lay down area.

It is therefore recommended that before authorising the activity a detailed site layout plan be submitted indicating the details of all infrastructure associated to the proposed mining development.

Public Participation Process (PPP)

From the information provided to the EAP regarding the PPP, it is unclear to verify whether or not the procedure highlighted by the 2014 EIA regulations (GN R. 982) was followed. No I&AP register were provided to indicate all the I&AP contacted.

It has however been pointed out by the report submitted as an Appendix to the Scoping report that the following communities were consulted:

- Dithamaga trust;
- Dithamaga Community;
- Mamphuru Community;
- Ga Pasha Community;
- Eerstegeluk Community;
- Bengonyama Community;
- Steelpoort Bridge Business Forum;
- Glencore; Samancor; and
- Eastern Platinum Limited.



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Proof of the above interactions was provided in form of the following:

Meeting minutes;

Attendance registers;

Agreement letters (however it pertained to the Prospecting phase of the project); and

Advertisement in local news paper (however it pertained to the Prospecting phase of the project).

During the time of the PPP on the Scoping report it is unclear whether or not concerns were raised by the I&AP.

In addition to the I&AP listed above the following groups were contacted, however it is unclear who the representative is:

Landowners/s;

Landowners or lawful occupiers on adjacent properties;

Municipal councillor; and

Municipality.

On the appointment of EMA as the EAP, Ecoleges Environmental Consultants were appointed as an independent consultant to manage the Public Participation Process on behalf of EMA. The details to the process followed are highlighted in section **g**)ii) of this report.

See **Appendix T** for the comments and response register for the process to date. However note that all the comments in this register and in the final PPP report will be incorporated in the revised EIR and EMPr.

Environmental Attributes associated with the sites

Although background information was provided on the Climate, Topography, Geology, and Surface water, no baseline information was provided on the following areas of concern:

Surface and groundwater quality;

Soil quality;

Air quality;

Human Health impact;

Noise quality

The information provided regarding the information on the Biodiversity were fatally flawed, as the attached Biodiversity Impact Assessment (**Appendix G**) pointed out. There are a number of sensitive floral features and some of the proposed infrastructure falls within Critical biodiversity areas and Ecological support areas as defined by the Limpopo Conservation Plan (LCP). In addition to the areas defined by the LCP the National Mining and Biodiversity Guidelines define a number of biodiversity priority areas. A large portion of the site layout and associated infrastructures are situated within a Category B



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(Highest biodiversity importance) priority area (refer to **Appendix G** for the detailed report). Considering the close proximity to the Sekhukhune Centre of Endemism, this poses the highest environmental risk and must be addressed

accordingly.

Description of specific environmental features and infrastructure on site

From the Scoping report it is unclear as to what specific infrastructures will be associated to the proposed activity. These

infrastructures has been defined in section 1)(c).

At the time of the Scoping report an inadequate amount of specialist baseline studies were conducted to determine

specific environmental features. As part of the EIA and development of the EMPr a number of sensitive environmental and

social features have been identified. Appendix Q provides the detailed site lay out plan in relation to the sensitive

receptors.

Plan of study (PoS) for the EIA process

Chapter 2 of GN R. 982 (2014 EIA regulations) requires the applicant to submit within 106 days from the acceptance of the

Scoping report the final EIR, EMPr, and Mine rehabilitation, closure, and liability plan. Within the 106 days, the registered

I&AP should be provided with the opportunity to access and comment on the reports for at least 30 days. The applicant

received the acceptance letter on the 22nd of October 2015. Section 3(2) of Chapter 2 of the 2014 EIA regulations stipulate

that for any actions contemplated in terms of the regulations for which a timeframe is prescribed, the period of 15

December to 5 January must be excluded. Therefore the appointed EAP determined the final submission date as the 29th

of February 2016.

Although the PoS in the accepted Scoping report indicated that specialist studies were going to be conducted, the lack of

baseline information required the scope of the specialist studies to include a baseline assessment as well as an impact

assessment of the associated fields of expertise. In addition to the inadequate specialist studies provided in the Scoping

report, the provision of a Mine Rehabilitation, closure, and liability plan as per GN R. 1147 were not included in the initial

PoS.

In addition to the specialist studies highlighted by the initial PoS, the acceptance letter of the Scoping report requested a

total of two additional Specialist studies, namely a Avifauna survey and a Bat Survey.

The Spitsvale Mine Rehabilitation closure and liability plan has been completed after the submission of a draft EIR and

EMPr to the DMR on the 29th of February 2016. This report complies with requirements set in GN R. 1142. The findings

and recommendations made were incorporated into this revised EIR and EMPr and are now subjected to a 30 days PPP

as required by GN R. 982.

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

risks



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(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).

Due to the lack in a detailed description of the methodology used to determine the potential significant environmental risk, it is unclear to verify whether or not there is a deviation from the Scoping report in this regard.

ii) Motivation for deviation

Methodological approach of the EAP according to International Best Practice as well as the principles set by the IEM quidelines.

u) Other information required by the competent Authority

The following additional information was requested by the Department of Minerals and Resources:

- Details of the EAP who prepared the report together with his/her expertise.
- Full description of activities to be taken.
- Specialist reports should be signed off by an independent specialist if it was prepared by the in-house specialist(s).
- Details of the future land use for the site and infrastructure after decommissioning in 20 30 years.
- The total footprint of the proposed development should be indicated.
- Should a Water Use License be required, proof of such application should be submitted.
- Possible impacts and effects of the development on the vegetation ecology with regard to lowland-highland interface in the locality should be indicated.
- The impacts of the proposed facility on avifauna and bats must be assessed in the EIA phase.
- Possible impacts and effects of the development on the surrounding industrial area.
- Information on services required on the site, e.g. sewage, refuge removal, water and electricity should be submitted. Furthermore, information on who will supply these services, agreement thereof and confirmation of the capacity to deliver such services should be submitted.
- A construction and operational phase in the EMPr should include mitigation and monitoring measures.
- Should blasting be required, appropriate mitigation measures should be provided.

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:



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"Procedures for the investigation, assessment and communication 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 implementation;
 - (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."



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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 D) and the Human health impact assessment (Appendix N) addresses

the associated impacts on the socio-economic conditions.

(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 Project 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 Permit area can only be located within the Prospecting Right area.



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ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

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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 Project Environmental Management System (EMS). The information provided in this section describes guidelines, operating procedures and rehabilitation/pollution control requirements which will be a legal binding document which the holder of the authorisation, upon granting the Mining right, will be held accountable for implementation.

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 ability 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 is to take place, the impacts associated to these activities should be assessed according to the requirements stipulated by GN R. 982. Therefore this EMPr is only applicable to the listed authorising activities as stipulated **Part A section d**)i).

1) Draft environmental management programme.

Part B of this report is considered to be the first draft EMPr and is subject to the approval of the Department of Minerals and Resources (DMR). Once approved this report should be finalised as the legal binding EMPr 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).



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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

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.

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 S**), 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, 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 in Part B of this report will aid in reaching the objectives stipulated in the documents listed above.

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.

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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 of managing the identified potential environmental impacts or risks described in Part A of this report (EIR) throughout the entire life cycle (from design, to implementation, operation, and decommissioning) of the proposed Spitsvale project. 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 project 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 the subsequent implementation of corrective actions when required. Therefore this document should be considered as a living document which should be continuously updated and possibly improved.

This approach taken in the development of the EMPr 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 Project 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 1)j) 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.



FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

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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.

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

No 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



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• 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 should form part of the final construction and operational EMPr 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 16 identifies and describes the measures to be taken to ensure a sustainable outcome.

Table 16: Recommended measures to control, avoid, mitigate, and remediate potential environmental and social risks identified in Part A of this report

ACTIVITIES	POTENTIAL	PHASE	SIZE AND	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR
(as listed in 2.11.1)	IMPACT	of operation in	SCALE of	(describe how each of the recommendations in herein will remedy the cause of pollution or	(A description of how each of the	IMPLEMENTATION
	(e.g. dust,	which activity will	disturbance	degradation and migration of pollutants)	recommendations herein will comply with any	Describe the time period
	noise,	take place.	(volumes,		prescribed environmental management standards	when the measures in the
	drainage	State; Planning	tonnages and		or practices that have been identified by	environmental management
	surface	and design, Pre-	hectares or m²)		Competent Authorities)	programme must be
	disturbance,	Construction'				implemented Measures
	fly rock,	Construction,				must be implemented when
	surface water	Operational,				required. With regard to
	contamination,	Rehabilitation,				Rehabilitation specifically
	groundwater	Closure, Post				this must take place at the
	contamination,	closure.				earliest opportunityWith
	air pollution					regard to Rehabilitation,
	etcetc)					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.
			1	Construction Phase		<u> </u>
1. Access and hauling	Dust	Construction &		Implementation of EMS:	(1) Development and implementation of a Dust	
along roads i.e. during	generation	Operational		(1) Development of a dust fallout monitoring plan.	management plan as part of an Air quality	
the construction of				(2) Frequent Inspections of areas prone to dust generation.	management plan to including the monitoring and	
roads				(3) Reporting and recording incidents related to air quality.	prevention programme.	
				(4) Ensuring corrective and preventative actions are taken to address nonconformities.	(2) Ensuring compliance with the National	
2. Site clearing and				(5) Communicating findings of concern to I&AP.	Environmental Management: Air Quality Act	Entire Life cycle of project
topsoil stripping for lay				On-site mitigation measures:	(NEMAQA), No. 39 of 2004 as amended by Act	
down area and all				(1) Construction activities to take place under the supervision of an environmental representative	no 20 of 2014.	
related mining				(2) Set the on-site speed limit to 40km/h for gravel roads and 50km/h for tar roads.	(3) Ensure activities remain under the thresholds	
infrastructure				(3) Develop and implement a dust suppression schedule.	stipulated in GNR 893 (in terms of section 21 of	
				(4) Biodegradable and environmentally friendly flocculent (approved by the environmental control	,	



5. Mining offices
(construction and
operation) i.e. operation
of training centres,
offices and kitchen
facilities

8. Pollution Control
Dams (PCD's) i.e.
Construction and
operation

officer/environmental officer/ SHEQ officer) may be used as dust suppressant.

- (5) Wetting of stockpile areas.
- (6) Covering loads with tarpaulin when transporting ROM, product, or any material in order to prevent dust generation.
- (7) Disturbed areas no longer used for mining related activities shall be re-vegetated immediately.
- (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.

Legal requirements:

- (1) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.
- (2) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).
- (3) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013).
- (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 should form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.

Specialist recommendations:

- (1) Development of 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) (**Appendix E**) prior to the commencement of operations.
- (2) Implementation of recommended dust control methods as stipulated in Table 6-1 of the BAQIAR (Appendix E).
- (3) Dust generated from material handling operations and mining operations can be significantly reduced by wet suppression with the use of water sprays.
- (4) The combined use of water sprays with chemical surfactants provide more extensive wetting making it a more affective technique than water suppression alone.
- (5) The loading, transfer, and discharge of materials should take place with a minimum height of fall and be shielded against the wind.
- (6) Controls to reduce emissions from unpaved roads can 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).
- (7) All positive and negative effects of the different methods of dust suppression should be considered and the best feasible and successful option must be implemented.
- (8) Wind erosion from stockpiles and open areas can be minimised through the use of water sprays, wind breaks, vegetation and enclosures.
- (9) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road per given time

- (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).
- (6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)

	1		1400		T
			(10) Hauling activities should be strictly restricted to designated hauling routes.		
			(11) Regular maintenance of the vehicles/trucks (engines) should be undertaken to ensure optimal		
			efficiency of the engine.		
			(12) Regular maintenance of hauling routes and surface improvements (where necessary) should be		
			undertaken.		
			(13) Regular sweeping and cleaning of tarred/paved road surfaces to prevent the accumulation of dust		
			(14) Immediate clean-up of any spillage of material on the hauling routes.		
			(15) Regular inspections should be carried out on the vehicles/trucks (engines, tyres, etc.) and the		
			route to ensure both are in good quality.		
			(16) All material transported should be covered, where possible, and not left exposed during		
			transportation.		
			(17) Engines of the trucks should not be left running whilst not in use.		
			(18) Clean fuels and fuel efficient vehicles/trucks/mobile equipment should be considered for use		
			where possible.		
			(19) Designated areas for the storage of overburden should be considered and incorporated into the		
			design.		
			(20) Monthly dust fallout monitoring as per the National Dust Control Regulations (2013) and reporting.		
			(21) Monthly PM10 and PM2.5 ambient monitoring and reporting. This is also recommended to obtain		
			baseline concentrations.		
			(22) All main hauling roads should be treated for dust suppression to maintain at least 65% emission		
			reduction efficiency.		
			,		
1. Access and hauling	Hydrocarbon	Construction &	Implementation of EMS:	(1) Development of water management plan	
along roads i.e. during	Contamination	Operational	(1) Develop and implement a Hazardous substances management plan addressing handling, storage,	addressing monitoring and management	
the construction of			and transport of hazardous substances.	requirements.	
roads			(2) Develop and implement an emergency response procedure addressing the procedure in case of a	(2) Development of a storm water management	
			chemical spill. This procedure should ensure the fastest possible reaction to spills or accidents as well	plan addressing the separation of "dirty" and	
2. Site clearing and			as addressing remediation procedures.	clean "areas"	
topsoil stripping for lay			(3) Development and implementation of an incident reporting procedure.	(3) Development of emergency response plan	
down area and all			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	with specific reference to spill prevention and	
related mining			(5) Communicating findings of concern to I&AP.	remediation.	Entire Life cycle of project
infrastructure			On-site mitigation measures:	(4) Development and implementation of	
2 Wainh huider			(1) Fuel to be stored in above ground storage tanks or sealed containers.	vehicle/plant/equipment maintenance plan with	
3. Weigh bridge			(2) Hazardous substances to be stored within a bund area with a sump drainage.	specific reference to daily inspections of	
6. Storm water runoff			(3) Bunded areas to be designed to contain at least 110% of the storing capacity.	plant/vehicles/equipment for leaks or breakages.	
management features			(4) All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed	(5) Development and implementation of a	
			environmental representative or the Department within 24 hours.	Hazardous substances management plan.	
9.Stores, workshops			(5) Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to		
	1				
&wash bays			a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used.		



	(6) On site spill kits or absorbent materials must be readily available. These kits must include materials
11. Fuel operating	to absorb, breakdown, and where possible encapsulate minor material spillages.
power generators	(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
13. Fuel storage	ensure the collection of any hydrocarbons.
15. Transport of	(8) All vehicles, plant, and equipment must be inspected on a daily basis. Records to be made
construction material,	available for these inspections.
mobile plant and	(9) Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment
equipment to the site	(where possible leaks may occur) when not in use.
Squipment to the one	(10) All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil
16. Use of existing	leakages.
drilled / new boreholes	(11) Leaking equipment shall be removed and repaired immediately from site to facility designated for
	repairs.
	Legal requirements:
	(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 should be included in the
	development of the Emergency Response procedure.
	(2) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of
	incidents involving Hazardous substances. These requirements should also be included in the
	Emergency response procedure.
	(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 should be incorporated into the
	Hazardous substances management plan.
	(4) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition
	of Hazardous chemicals. These requirements should be considered as part of the mine acquisition
	process.
	(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 should be incorporated in both the
	Hazardous substances management plan and the Waste Management plan.
	(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 should be addressed in the
	Hazardous substances management plan.
	(7) All requirements described in the Hazardous substance Act of 1973 should be included in the
	Hazardous substances management plan.
	(8) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the
	National Environmental Management Act.
	Specialist recommendations:
	Geohydrology –
	(1) Development of an environmental monitoring programme in order to monitor the groundwater

1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 9.Stores, workshops &wash bays 10. Ablutions & change	Degradation of soil resources	Construction & Operational	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). (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 Appendix M) to be included into a monthly/quarterly monitoring programme. (4) The parameters to be analysed should comprise the following: Physical-chemical parameters (pH, EC, TDS);Major anions (F, CI, NO3, SO4, HCO3, NH4, PO4);Major cations (K, Na, Mg, Ca, NH4.); and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI),). Hydrology - (1) A number of monitoring sample points have been identified in the Hydrological report (Appendix L). Additional sampling points have been recommended and should be included in the final water monitoring plan. (2) 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 with the approval of DWAS. (3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan for metals. Implementation of EMS: (1) Develop and implement a soil conservation and stockpile management plan. (2) Frequent Inspections of areas prone to degradation. (3) Reporting and recording incidents related to degradation of soil resources. (4) Ensuring corrective and preventative actions are taken to address nonconformities. (5) Communicating findings of concern to I&AP. (6) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA. On-site mitigation measures: (1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area. (2) Do not mix sub-soil with topsoil and fertile soils. (3) Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons o	(1) Development of a soil conservation management plan. (2) Development of a storm water management plan. (3) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.	Entire Life cycle of project
			(1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area. (2) Do not mix sub-soil with topsoil and fertile soils.		Entire Life cycle of project
&wash bays					
10. Ablutions & change house with sewage treatment plant			stockpiles with indigenous, non-invasive vegetation. (5) Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood lines.		
11. Fuel operating power generators			(6) Implement storm water control measures on topsoil and fertile soil stockpiles.(7) Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from erosion.		
13. Fuel storage			(8) Rehabilitation of areas after the completion of works to take place as soon as possible.		

	Γ	T	(0) Avoid over expening up vegetated areas as far as possible	T	<u> </u>
			(9) Avoid over exposing un-vegetated areas as far as possible.		
			Legal requirements:		
			(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.		
			(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 silinization of soils by means of		
			suitable soil conservation works to be constructed and maintained. These requirements should form		
			part of the Soil Conservation and Stockpile management plan.		
			<u>Specialist recommendations</u> :		
			(1) Strip all usable soil, irrespective of soil depth.		
			(2) Implement live placement of soil where possible, improve organic status of soils, maintain fertility		
			levels and curb topsoil loss.		
			(3) Implement surface digital terrain mapping to ensure surface water control measures are		
			implemented to ensure free draining system with minimal soil erosion.		
			(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.		
			(5) Loss of agricultural land due to opencast mining is a temporary loss which can be mitigated by		
			appropriate backfilling and re-placement of stockpiled topsoil. If done correctly, most of the original		
			agricultural potential will be restored.		
			(6) An Environmental Coordinator must manage environmental impacts in coordination with		
			construction and operation schedule.		
			(7) In the event that contractors are to be appointed these contractors to sign and undertake		
			environmental compliance.		
			(8) Keep disturbed areas and stockpiles to minimum to prevent soil loss.		
			(9) Identify suitable areas to stockpile stripped soil.		
			(10) Prevent surface runoff and seepage on site from contaminating stockpiled soils and stripped		
			areas.		
			(11) Minimise soil erosion through wind and water		
			(12) Remediate and rehabilitate disturbed areas in accordance with development plan		
			(12) Nomediate and renabilitate disturbed areas in accordance with development plan		
1. Access and hauling	Erosion	Construction &	Implementation of EMS:	(1) Development and implementation of a storm	
along roads i.e. during		Operational	(1) Development and implementation of a storm water management plan.	water management plan.	
the construction of			(2) Regular inspection of erosion prone areas for signs of erosion.	(2) Development of a soil conservation	
roads			(3) A soil conservation and stockpiling plan to be developed and implemented.	management plan.	
			(4) Monthly monitoring of water quality (as per recommendation of specialist study).	(3) Development of Mine Rehabilitation,	Entire Life cycle of project
2. Site clearing and			(5) Reporting and recording incidents related to erosion.	decommissioning and mine closure liability Plan	
topsoil stripping for lay			(6) Ensuring corrective and preventative actions are taken to address nonconformities.	in compliance with GN R. 1147 of NEMA.	
down area and all			(7) Communicating findings of concern to I&AP.	·	
related mining			On-site mitigation measures:		



infrastructure	(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.
6. Storm water runoff	(2) All areas susceptible to erosion must be identified and protection measures be implemented.
management features	(3) Retain natural trees, shrubbery and grass species where possible.
	(4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to
15. Transport of	be implemented, specifically when excavations or disturbances takes place within river banks, or the
construction material,	
mobile plant and	river bed. (5) Formation of avoice about ("danger") to be provented by applying acid avoice control and
equipment to the site	(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.
	(6) Erosion formation beyond rills must be avoided.
	(7) Erosion damages to be repaired as soon as possible and no later than the target set by the
	Management team.
	(8) Slopes steeper than 1(V):4(H) or slopes where soils are by nature dispersive or erodible must be
	stabilised.
	(9) Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent
	erosion from starting on berms.
	(10) Access routes should not traverse slopes with gradients in excess of 8%.
	(11) Wherever possible, access routes should avoid crossing drainage lines and riparian zones.
	(12) Drainage lines should not be altered and should be level with the surrounding land once
	subsistence has occurred.
	(13) Run-off from roads must be managed in a way to avoid erosion and prevent pollution.
	Legal requirements:
	(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.
	(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 silinization of soils by means of
	suitable soil conservation works to be constructed and maintained. These requirements should form
	part of the Soil Conservation and Stockpile management plan.
	Specialist recommendations:
	Hydrology –
	(1) A conceptual storm water management plan (Appendix L) has been developed based on the
	requirements of GN R. 704 of the National Water Act of 1998.
	(2) Implementation 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 should be consulted during the detailed design phase.
	Soil –
	(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.
	(2) The surface of the completed stockpile must be left in a rough condition to promote water
	(-) 3

			infiltration and minimise erosion prior to vegetation establishment; (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); (4) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion. (5) Minimise soil erosion through wind and water **Biodiversity - Also see Vegetation and Habitat loss** (1) Limit the complete removal of vegetation. (2) Limit work outside the proposed footprint. (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. (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).		
1. Access and hauling along roads i.e. during	Vegetation and habitat loss	Construction & Operational	Implementation of EMS: (1) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	(1) Develop a plant species search and rescue management plan.	
the construction of			compliance with GN R. 1147 of NEMA.	(2) Development of Mine Rehabilitation,	
roads			(2) Develop and implement a plant species search and rescue management plan.	decommissioning and mine closure liability Plan	
			(3) Regular inspection of sensitive areas.	in compliance with GN R. 1147 of NEMA.	
2. Site clearing and			(4) A soil conservation and stockpiling plan to be developed and implemented.	(3) Develop and implement a soil conservation	
topsoil stripping for lay			(5) Reporting and recording incidents related to unnecessary clearance of vegetation.	management plan.	
down area and all			(6) Ensuring corrective and preventative actions are taken to address nonconformities.	(4) Apply for permits to remove protected species	
related mining			(7) Communicating findings of concern to I&AP.	(provincial and national).	
infrastructure			(8) Record keeping of all removed/relocated species.		
6. Storm water runoff			On-site mitigation measures:		Forting 1 St. 1 . 1 . 1
management features			(1) Avoid clearing areas outside the development footprint.		Entire Life cycle of project
			(2) Avoid development in sensitive environments such as areas within pristine or valuable ecological		
			significance.		
			(3) Before the commencement of any vegetation clearance, a search and rescue operation should		
			take place identifying possible protected species as well as indigenous species.		
			(4) An area should be identified to re-instate protected and indigenous areas.		
			(5) If feasible an onsite nursery should be established and maintained.		
			<u>Legal requirements</u> :		
			(1) Section 28 of NEMA describes the duty of care and remediation of environmental damage.		
			(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.		

ASSOCIATED ACTIVI	VIIIES
	(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.
	Specialist recommendations:
	Terrestrial Ecology –
	(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.
	(2) Themeda triandra – Diheteropogon amplectens Grasslands (High sensitivity rating – Avoid
	as far possible)
	(2.1) Development in Grasslands should be limited to the absolute minimum, aiming for minimal to no
	alteration of the habitat configuration.
	(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.
	(2.3) Components of the proposed development that should under no circumstance be located in this
	vegetation would include:
	(2.3.1) Buildings and/or ablution facilities;
	(2.3.2) Any form of waste/soil/overburden disposal or stockpiling
	(2.3.3) Tailings dams or processing plants; and
	(2.3.4) Any form of storage of materials or machinery.
	(3) Cyperus sexangularis – Flueggea virosa Riparian Vegetation (No Go Area – only suitable
	crossings permissible)
	(3.1) Development in this vegetation/habitat and at least 50 m beyond should be limited to crossings of
	access roads only, aiming for minimal to no alteration of the habitat configuration.
	(3.2) Mining/development in this vegetation/habitat is strongly discouraged.
	(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.
	(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.
	(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.
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within 100 m of any drainage would include: (3.6.1) Buildings and/or ablution facilities;

(3.6.3) Tailings dams or processing plants; and

(3.6.4) Any form of storage of materials or machinery

(3.6.2) Any form of waste/soil/overburden disposal or stockpile;

(3.6) Components of the proposed development that may under no circumstance be located in or

(4) Acacia tortilis – Dichrostachys cinerea Dry Mixed Bushveld (Medium Low sensitivity)
(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.
(4.2) Community members should 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.
(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.
(4.4) Mine management of the Spitsvale Project 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 should be done to break the sealed upper surface
and reduce sheet erosion:
(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;
(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;
(4.4.3) If possible, hand-collected seeds from surrounding areas should be re-introduced to the rips;
(4.4.4) Use the cleared thorn bushes to loosely brush-pack the area - with the branching side facing
upslope
(5) Kirkia wilmsii – Terminalia prunioides variable Bushveld (Medium-High sensitivity – Avoid
as far possible)
(5.1) Mining/development in this vegetation/habitat should be limited to the absolute minimum, aiming
for minimal alteration of the habitat configuration.
(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.
(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.
(5.4) After decommissioning, it will be important to facilitate the re-establishment of a diverse
vegetation layer as soon as possible.
(6) Hippobromus pauciflorus – Rhoicissus tridentata Rock Outcrops (High sensitivity – Treat as
No Go Areas as far possible)
(6.1) Same requirements as stipulated under (5).
(7) Combretum hereroense – Euclea sekhukhuniensis low bushveld (No Go, only limited

(7.1) Mining/development in this vegetation/habitat is strongly discouraged, aiming for no alteration of

(7.2) Adjacent (upstream) areas also need to be cleared with care, ensuring that no excessive runoff is

access roads permissible)

directed toward the donga plains.

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(7.3) Although current dongas may be relatively old and stable, r	new and accelerated erosion must be		
monitored and mitigated at all times.			
(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 pla	ins have been impacted.		
(8) Rehabilitate and re-vegetate all areas that have been disturbe	d as soon as practically possible.		
(9) Continually monitor the progress/success of rehabilitation effects	orts and adapt if rehabilitation targets	;	
are not met in acceptable timeframes			
(10) As part of decommissioning, all stockpiles must be entirely	obliterated and landscaped to merge		
into the surroundings.			
(11) Keep main internal access route as planned along existing gr	ravel roads.		
(12) After the final layout of mining operation components has	been approved, conduct a thorough		
footprint investigation to determine any protected or red data p	lant species population location and		
size, and animal burrows:			
(12.1) Map (by GPS) as far as possible larger concentrations of la	arge trees and protected species tha	:	
could be avoided or must be relocated;			
(12.2) Protected trees, succulents and geophytes: must be reloca	ited (trees as far as feasible);		
(12.3) Animal burrows: must be monitored by EO/ECO prior to gr	round clearing for activity/presence or	:	
animal species. If detected, such animals must be remove	ved and relocated by a qualified		
professional/contractor.			
(13) Strictly restrict all movement of vehicles and heavy machine	ery to permissible areas, these being		
designated access roads, maintenance roads, turning points an	nd parking areas. No off-road driving		
beyond designated areas may be allowed.			
(14) Animals accidentally injured by moving vehicles or ma	achinery must be taken to a loca		
veterinarian to be treated or put down in a humane manner.	,		
(15) Create designated turning areas and strictly prohibit any o	off-road driving or parking of vehicles	:	
and machinery outside designated areas.	0 1 0		
(16) Keep the clearing of natural veldt to a minimum.			
(19) It is desirable that community members be engaged to rem	love wood suitable for their purposes		
from areas to be cleared to alleviate the pressure of wood-harve			
land portions.	Journal of the direct dieds of the		
(20) All remaining material of cleared shrubs and trees must be sl	hredded and used as mulch		
(21) Topsoil (the upper 25 cm of soil) is an important natural			
geophytic storage organs as well as valuable soil seed resources			
	,		
can (and then must) be stripped, never mix it with subsoil or an	•	•	
separately until it can be re-applied, minimise handling of topsoil.			
(21) Adherence to the comprehensive Plant Search and rescu	•		
Management plan (Appendix E of the Biodiversity Impact Report	(Appendix & to this report)).		

(1) Leave, as far as possible, as much of the natural indigenous bush undisturbed and in its pristine

Avifauna –

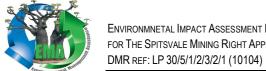
			sate.		
			(2) Route connecting roads as close as is possible to already developed sites or roads.		
			(3) Restrict or prohibit any off-road driving in areas of pristine indigenous bush.		
			(4) Route power lines along these connecting roads, or if possible route them underground.		
			Bat Survey –		
			(1) Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely		
			necessary.		
			(2) Discourage vehicles from driving through the natural vegetation were mining activities are not		
			taking place.		
			(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.		
			(4) Prohibit any chemical and/or heavy metal from being released into the environment.		
			(5) Manage all waste water and stormwater to prevent pollution to water bodies.		
4.4	0-45	Occupies 2	landon attitue of FMO.	(A) Pourley a star of the star	
1. Access and hauling	Sedimentation	Construction &	Implementation of EMS:	(1) Develop a storm water management plan.	
along roads i.e. during	and siltation of	Operational	(1) Development and implementation of water quality monitoring plan.	(2) Develop and implement a water management	
the construction of	watercourses		(2) Development and implementation of an incident reporting procedure.	plan and specifically include water monitoring and	
roads			(3) Ensuring corrective and preventative actions are taken to address nonconformities.	pollution prevention strategies.	
2. Site clearing and			(4) Communicating findings of concern to I&AP.		
topsoil stripping for lay			(5) Development and implementation of a storm water management plan.		
down area and all			(6) Regular inspection of erosion prone areas for signs of erosion.		
related mining			(7) A soil conservation and stockpiling plan to be developed and implemented.		
infrastructure			On-site mitigation measures:		
			(1) Avoid stockpiling material within drainage lines or in the 1:10 year flood line.		
6. Storm water runoff			(2) Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas.		
management features			(3) Prevent the discharge of water containing polluting matter or visible suspended materials directly into drainage lines or streams.		Entire Life cycle of project
45 Transport of			(4) Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas,		
15. Transport of			workshops, lay down areas etc.		
construction material,			(5) Water from excavations or mining areas either through seepage or collection to be pumped and		
mobile plant and			discharge into a pollution control dam.		
equipment to the site			(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.		
			(7) River crossings shall be designed by a registered civil engineer.		
			(8) Measures to avoid or prevent erosion formation must be incorporated into the designs of the		
			infrastructure associated with the river crossings.		
			(9) During construction through drainage lines, the majority of the flow must be allowed to pass down		
			the stream. In stream diversions should be used rather than the construction of new channels.		
			Legal requirements:		



Г			(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or		<u> </u>
			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.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of 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).		
			(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 Appendix M) to		
			be included into a monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
1. Access and hauling	Noise	Construction &	Implementation of EMS:	(1) Develop and implement a noise monitoring	
along roads i.e. during	generation	Operational	(1) Development and implementation of a Acoustical Measurement & Audit Programme as part of the	programme to ensure compliance with the	
the construction of			EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F).	National Noise Control Regulations and	
roads			(2) Recording, reporting, and remediating incidents related to noise.	SANS10103:2008 guidelines.	Before and during all
			(3) Regular inspections of plant.	(2) Develop and implement a	phases on a quarterly basis.
2. Site clearing and			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	vehicle/plant/equipment management plan to	
topsoil stripping for lay			(5) Communicating findings of concern to I&AP.	specifically include routine inspections and	
down area and all			On-site mitigation measures:	testing of sound frequencies.	
		<u> </u>		<u>'</u>	



(1) Limit the maximum speed on the haul roads to 60 km/h or less. Road speeds should 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.	
(2) Roads should 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.	
(3) Regular inspections and servicing of plant.	
Legal requirements:	
(1) Compliance with the National Noise control regulations.	
Specialist recommendations:	
(1) Design an Acoustical Measurement & Audit Programme. Note: If there are no noise-sensitive	
receptors within 1,000m from any mining activities no routine noise monitoring will be required.	
The developer should consider maintain these unpaved routes regularly smoothing out irregularities	
on the routes.	
	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. (2) Roads should be planned so as to reduce heavy vehicles reversing when collecting or dumping at stockpiles/flips etc. (E.g. use of a loop instead of a dead-end road). This will minimise the use of reverse alarms on vehicles. (3) Regular inspections and servicing of plant. Legal requirements: (1) Compliance with the National Noise control regulations. Specialist recommendations: (1) Design an Acoustical Measurement & Audit Programme. Note: If there are no noise-sensitive receptors within 1,000m from any mining activities no routine noise monitoring will be required. (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



1. Access and hauling	Alteration of	Construction &	Implementation of EMS: (1) Develop and implement a storm water	
along roads i.e. during	drainage	Operational	(1) Develop a water monitoring management plan. management plan.	
he construction of	patterns		(2) Record and report all incidents related to affecting water quality. (2) Develop and implement a water management	
roads			(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in plan specifically including a strategy for the	
			compliance with GN R. 1147 of NEMA. management of alterations to drainage patterns.	
2. Site clearing and			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	
opsoil stripping for lay			(5) Communicating findings of concern to I&AP.	
down area and all			(6) Development and implementation of a storm water management plan.	
related mining			(7) Regular inspection of erosion prone areas for signs of erosion.	
infrastructure			(8) A soil conservation and stockpiling plan to be developed and implemented.	
6. Storm water runoff			On-site mitigation measures:	
management features			(1) Plan the final site layout in a manner as to reduce alteration of drainage patterns.	
management reatures			(2) In the event that drainage patterns will be altered, the natural flow to be diverted.	
			(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation	
			and sedimentation.	
			(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence	
			conditions.	
			(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.	Entire Life cycle of proje
			(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to	
			prevent the formation of erosion dongas or rills.	
			Legal requirements:	
			(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.	
			Specialist recommendations:	
			Geohydrology –	
			(1) Development of 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).	
			(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 Appendix M) to be included into a	
			monthly/quarterly monitoring programme.	
			(4) The parameters to be analysed should 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),).	

(5) 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.
(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major
and trace elements) of pumped water.
Hydrology –
(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix
L). Additional sampling points have been recommended and should be included in the final water
monitoring plan.
(2) 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 with
the approval of DWAS.
(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan
for metals.
(4) A conceptual storm water management plan (Appendix L) has been developed based on the
requirements of GN R. 704 of the National Water Act of 1998.
(5) Implementation 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 should be consulted during the detailed design phase.
grass covers to avoid crosion and should be consulted during the detailed design phase.

1. Access and hauling	Destruction of	Construction &	Implementation of EMS:	(1) Develop and implement a storm water	
along roads i.e. during	upstream	Operational	(1) Develop a water monitoring management plan.	management plan.	
the construction of	tributaries and		(2) Record and report all incidents related to affecting water quality.	(2) Develop and implement a water management	
roads	reduction in		(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	plan specifically including a strategy for the	
	water in the		compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to	management of alterations to drainage patterns.	
	catchment		reinstatement of drainage lines.		
			(4) Ensuring corrective and preventative actions are taken to address nonconformities.		
			(5) Communicating findings of concern to I&AP.		
			(6) Development and implementation of a storm water management plan.		
			(7) Regular inspection of erosion prone areas for signs of erosion.		
			(8) A soil conservation and stockpiling plan to be developed and implemented.		
			On-site mitigation measures:		
			(1) Plan the final site layout in a manner as to reduce the destruction of upstream tributaries.		
			(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.		
			(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation		
			and sedimentation.		
			(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence		
			conditions.		Entire Life cycle of proje
			(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.		
			(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to		
			prevent the formation of erosion dongas or rills.		
			Legal requirements:		
			(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.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of 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).		
			(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 Appendix M) to		
			be included into a monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),). (5) 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. (6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major and trace elements) of pumped water. **Hydrology** – (1) A number of monitoring sample points have been identified in the Hydrological report (Appendix L). Additional sampling points have been recommended and should be included in the final water monitoring plan. (2) 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 with the approval of DWAS. (3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan for metals. (4) A conceptual storm water management plan (Appendix L) has been developed based on the requirements of GN R. 704 of the National Water Act of 1998. (5) Implementation 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 should be consulted during the detailed design phase.		
1. Access and hauling along roads i.e. during the construction of roads	Water usage for dust suppression	Construction & Operational	Implementation of EMS: (1) Water usage monitoring plan to be developed and implemented. (2) Create awareness of water conservation. On-site mitigation measures: (1) Filtered or treated water from PCD's 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. (2) Monitor water usage and ensure that areas of waste are identified and minimised. (3) Where possible, reuse water from the PCD's for dust suppression on the roads. Legal requirements: (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.	(1) Development and implementation of a Dust management plan including the monitoring and prevention programme.(2) Develop and implement a water usage record keeping procedure.	Entire Life cycle of project
1. Access and hauling along roads i.e. during the construction of roads	Influx of alien invasive vegetation	Construction	Implementation of EMS: (1) Development and implementation of an alien and invasive control plan (2) Awareness training on the identification of weeds and alien species to employees responsible for the management of these species.	(1) Develop and implement an alien eradication and control management plan.	Entire Life cycle of project



2. Site clearing and
topsoil stripping for lay
down area and all
related mining
infrastructure

5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities

On-site mitigation measures:

- (1) Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to prevent re-growth.
- (2) All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and weeds.
- (3) Chemical removal shall be used in accordance with the manufacturer's specification for weeds where mechanical eradication/control is no longer affective.
- (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.
- (5) Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to be manually removed from site.
- (6) The herbicide consultant must have a Pest Control Operators licence.
- (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.

Legal requirements:

- (1) Adherence to requirements stipulated by GN R. 598 of NEMBA.
- (2) Section 3: Category 1b Listed Invasive Species (A total number of 6 species were identified

- Appendix G):

- (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.
- (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.
- (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.
- (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.
- (3) Section 4. Category 2 Listed Invasive Species (One specie has been identified Agave sisalana):
- (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.
- (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.
- (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.
- (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.	I	
			(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.		
			(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.		
			(4) Section 5. Category 3 Listed Invasive Species (One specie has been identified – Morus		
			alba):		
			(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.		
			(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.		
			(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.		
			(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.		
			(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.		
			(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.		
			Specialist recommendations:		
			(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.		
			(3) If filling material is to be used, this should be sourced from areas free of invasive species		
			(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.		
			(5) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive		
			Management plan (Appendix E of the Biodiversity Impact Report (Appendix G to this report)).		
1. Access and hauling	CO ₂ emissions	Construction &	Implementation of EMS:	(1) Develop and maintain a Carbon footprint	
along roads i.e. during	& Release of	Operational	(1) Develop and maintain a carbon footprint reporting policy.	reporting policy.	Entire Life cycle of project
the construction of	noxious		(2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.	(2) Develop and maintain a	
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roads	daccoc	T T	On-site mitigation measures:	Vehicle/Plant/Equipment maintenance plant.	
IJaus	gasses			venicien ianu Equipment maintenance piant.	
2. Site clearing and			(1) Plant and equipment to function at an optimal level.		
topsoil stripping for lay			(2) Where possible lead replacement petrol to be used.		
down area and all			(3) Where possible low sulphur containing diesel to be used.		
related mining			(4) All vehicles and equipment must be maintained and serviced according to the manufacturer's		
infrastructure			specification.		
			(5) Any vehicle, plant or equipment emitting visible emissions from their exhaust systems must be		
9.Stores, workshops			serviced or repaired immediately.		
&wash bays			Legal requirements:		
			(1) Section 39 of the Atmospheric Pollution Prevention Act of 1965 and GN R. 1651 specifies		
11. Fuel operating			requirements regarding the control of emissions from diesel vehicles used on public roads. These		
power generators			requirements should form part of the Air quality Management Plan and the Vehicle/Plant/Equipment		
AE Transcrates			maintenance plan.		
15. Transport of					
construction material,					
mobile plant and					
equipment to the site					
2. Site clearing and	Topography	Construction	Implementation of EMS:	(1) Mine plan in accordance with the MPRDA	
topsoil stripping for lay	and visual		(1) Record keeping of the topography and environmental state before the commencement of any	Regulation 56 section (1) to (8).	
down area and all	alteration		activities.	(2) Adherence to the finalised approved lay out	
related mining			(2) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	plan.	
infrastructure			compliance with GN R. 1147 of NEMA.	(3) Development of Mine Rehabilitation,	
			On-site mitigation measures:	decommissioning and mine closure liability Plan	
5. Mining offices			(1) Limit site clearance to approved areas.	in compliance with GN R. 1147 of NEMA.	
(construction and			(2) Re-vegetate, with indigenous and non-invasive species, all cleared or rehabilitated areas	· ·	Rehabilitation and
operation) i.e. operation			immediately.		Decommissioning
of training centres,			(3) During rehabilitation ensure that the topography is reinstated as close as possible to the state		
offices and kitchen			before commencement of any activities.		
facilities			Legal requirements:		
			(1) GN R. 1147 of NEMA requires the following documents as part of the authorisation process:		
			(1.1) A annual rehabilitation plan;		
			(1.2) A final rehabilitation, decommissioning and mine closure plan; and		
			(1.3) An environmental risk assessment report.		
			(1.3) An environmental risk assessment report.		
2. Site clearing and	Water level	Construction &	Implementation of EMS:	(1) Develop and implement a water management	
topsoil stripping for lay	reduction and	Operational	(1) Develop a water monitoring management plan.	plan and specifically include measures to be	Entire Life cycle of project
down area and all	contamination	,	(2) Record and report all incidents related to affecting water quality.	implemented to reduce the impact on surface and	
			() and the commentation of the comment of the comm	The state of the s	



related mining	(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in groundwater reduction.	
infrastructure	compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to (2) Ensure compliance with the issued WUL	
	reinstatement of drainage lines. requirements.	
16. Use of existing	(4) Ensuring corrective and preventative actions are taken to address nonconformities. (3) Develop and implement a storm water	
drilled / new boreholes	(5) Communicating findings of concern to I&AP. management plan and specifically address the	
	(6) Development and implementation of a storm water management plan. diversion of "clean" water into the natural	
	(7) Regular inspection of erosion prone areas for signs of erosion. drainage lines.	
	(8) A soil conservation and stockpiling plan to be developed and implemented.	
	(9) Create awareness of water conservation.	
	On-site mitigation measures:	
	(1) River crossings or storm water channels shall be designed by a registered civil engineer.	
	(2) Measures to avoid or prevent erosion formation must be incorporated into the designs of the	
	infrastructure associated with the river crossings.	
	(3) During construction through drainage lines, the majority of the flow must be allowed to pass down	
	the stream. In stream diversions should be used rather than the construction of new channels.	
	(4) Filtered or treated water from PCD's 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.	
	(5) Monitor water usage and ensure that areas of waste are identified and minimised.	
	(6) Where possible, reuse water from the PCD's for dust suppression on the roads.	
	(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.	
	Legal requirements:	
	(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.	
	Specialist recommendations:	
	Geohydrology –	
	(1) Development of 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).	
	(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 Appendix M) to be included into a	
	monthly/quarterly monitoring programme.	
	(4) The parameters to be analysed should 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,);	

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			and Other elements/metals (Fe, Mn, Zn, Pb, Co, Cr, Cr (VI),).		
			(5) 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.		
			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
2. Site clearing and	Destruction of	Construction &	Implementation of EMS:	(1) Ensure compliance with the National Heritage	
topsoil stripping for lay	graves	Operational	(1) Develop and implement an awareness campaign on the protection of social heritage impacts.	Resources Act (NHRA), No. 25 of 1999.	
down area and all			On-site mitigation measures:	(2) Ensure compliance with the Human Tissue	
related mining			(1) If human remains are uncovered during the course of authorised activities or archaeological work,	Act, 1983 (Act no. 65 of 1983.	
infrastructure			the excavations affecting the burial must be stopped.		
			(2) SAHRA should 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.		
			(3) It is, therefore, advisable that if it is foreseen that any archaeological research will uncover human		Entire Life cycle of project
			remains an agreement with the interested and affected parties and a permit for burials be obtained		
			beforehand.		
			(4) A suitable accredited archaeologist must be appointed on a watching brief to monitor the		
			(4) A suitable accredited archaeologist must be appointed on a watching brief to monitor the excavation of any grave sites.		
			excavation of any grave sites.		
			excavation of any grave sites. (5) At the onset of construction or mining operations, all graves that might be affected should be		
			excavation of any grave sites. (5) At the onset of construction or mining operations, all graves that might be affected should be clearly demarcated and if possible fenced off to protect them from any accidental damage, whether		
			excavation of any grave sites. (5) At the onset of construction or mining operations, all graves that might be affected should be		

			and experienced service provider must be appointed to undertake relocation.		
			(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.		
			Legal requirements:		
			(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).		
			Specialist recommendations:		
			(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage		
			Impact Assessment (HIA) report attached as Appendix O).		
			(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 can be made.		
			Homestead sites –		
			(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.		
			(4) It is recommended that the sites are retained, and that it should 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.		
			(5) If the sites cannot be retained, it should be documented (mapped and excavated) by an		
			archaeologists after obtaining a permit from SAHRA.		
			(6) 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.		
			Informal burial sites –		
			(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.		
			(8) If the burial places are retained, it should 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.		
			(9) If the graves cannot be retained, it should be relocated, but only on condition of following the		
			correct procedures (see Appendix 3 of the HIA attached as Appendix 0).		
2. Site clearing and	Degradation of	Construction &	Implementation of EMS:	(1) Ensure compliance with the National Heritage	
topsoil stripping for lay	cultural	Operational	(1) Develop and implement an awareness campaign on the protection of social heritage impacts.	Resources Act (NHRA), No. 25 of 1999.	
down area and all	significance		On-site mitigation measures:	(2) Ensure compliance with the Human Tissue	
related mining	heritage sites		(1) The position of known sites, as identified by the heritage impact assessment, must be clearly	Act, 1983 (Act no. 65 of 1983.	Entire Life cycle of project
infrastructure			identified and marked and considered in the final site lay out.		
			(2) Such areas shall be market as no-go areas.		
			(3) Artefacts may not be removed under any circumstances.		
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			(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.		
			(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.		
			(6) Works must be stopped immediately should any elements of cultural or heritage significance be		
			found.		
			(7) Do not resume works in the area in question without the required permits or authorisation from the		
			competent authority.		
			(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.		
			Legal requirements:		
			(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).		
			Specialist recommendations:		
			(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage		
			Impact Assessment (HIA) report attached as Appendix O).		
			(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 can be made.		
			Homestead sites –		
			(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.		
			(4) It is recommended that the sites are retained, and that it should 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.		
			(5) If the sites cannot be retained, it should be documented (mapped and excavated) by an		
			archaeologists after obtaining a permit from SAHRA.		
			(6) 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.		
			Industrial/Infrastructural heritage –		
			(7) A single site defined as of industrial/infrastructural heritage was identified.		
			(8) It is recommended that the irrigation system should be documented (photographed and mapped) in		
			before mining activities takes place.		
4. Onsite Clinic	Medical Waste	Construction &	Implementation of EMS:	(1) Development of a Health and Safety	
	generation	Operational	(1) Develop and implement a Waste Management plan.	management plan specifically addressing the	Entire Life cycle of project
			(2) Develop and implement a waste recoding procedure.	management of medical waste.	

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			(3) Develop and implement a Health and Safety management plan, including the handling of medical	(2) Development of a management plan for the	
			waste.	operation of the on-site Clinic.	
			(4) Regular inspections of designated waste management area and/or facilities.	(3) Development and implementation of a	
			(5) Reporting and recording of waste related incidents.	detailed Waste management plan.	
			(6) Continuous awareness training on Recycling, Reduction, Re-use, and avoidance of waste.		
			On-site mitigation measures:		
			(1) Ensure that all first aid facilities are equipped with specialised medical waste disposal bins.		
			(2) Appoint a specialised and suitably accredited medical waste service provider.		
			(3) Ensure that at no circumstance any medical waste generated from an first aid incident are mixed		
			into general or hydrocarbon contaminated waste.		
			(4) Ensure all personnel are made aware of the dangers of medical waste.		
			(5) Record must be kept of all medical waste generated throughout the entire life cycle of the project.		
			(6) Safe disposal certificates to be obtained and kept on record.		
			(7) All appointed first aid personnel must be trained in management of medical waste.		
			<u>Legal requirements</u> :		
			(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.		
			(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.		
			(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		
4. Onsite Clinic	Electricity	Operational	Implementation of EMS:	(1) Develop and implement a electricity usage	
	usage		(1) Calculate and record the carbon emissions that may arise from the authorised activities.	monitoring programme.	
5. Mining offices			(2) Monitor the carbon footprint of the project throughout the entire life cycle.	(2) Develop and implement a carbon footprint	
(construction and			(3) Develop an awareness campaign on power saving and electricity usage.	reporting policy.	
operation) i.e. operation			On-site mitigation measures:		
of training centres,			(1) Keep record of the carbon emissions produced on site to monitor the carbon footprint of the		Entire Life cycle of project
offices and kitchen			project.		
facilities			(2) Ensure that all unnecessary office equipment, air cons, and lights are switched off at the end of		
			each shift.		
12. Lighting			(3) If feasible, the use of solar powered geysers will allow for the reduction in contributing to the		
			carbon footprint of the project.		
			(4) Consider and investigate the feasibility of switching to "green" energy options.		
4. Onsite Clinic	Domestic	Operational	Implementation of EMS:	(1) Develop and implement a water usage record	
	water usage		(1) Development and implementation of water quality monitoring plan.	keeping procedure.	Entire Life cycle of project
5. Mining offices			(2) Create awareness of water conservation.	(2) Develop and implement a infrastructure	
(construction and					
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operation) i.e. operation			On-site mitigation measures: maintenance programme to include frequent	
of training centres,			(1) Ensure that all taps and pipes are maintained to avoid spills or leaks. inspections of water pipes and taps.	
offices and kitchen			(2) Monitor water use and ensure that areas of waste are identified and minimised.	
facilities			(3) Repair identified leaks and address issues of water wastage as soon as these are identified.	
			(4) Where possible reuse water on site for dust suppression.	
5. Mining offices	General waste	Construction &	Implementation of EMS: (1) Compliance with the National Environmental	
(construction and	generation &	Operational	(1) Develop and implement as waste management plan with the focus on reuse, reduce, recycle, or Management: Waste Act, act no 59 of 2008 and	
operation) i.e. operation	Littering		avoid. associated regulations.	
of training centres,			(2) Development and maintenance of a waste disposal record keeping system.	
offices and kitchen			(3) Regular inspections of designated waste management area and/or facilities.	
facilities			(4) Reporting and recording of waste related incidents.	
			(5) Continuous awareness training on Recycling, Reduction, Re-use, and avoidance of waste.	
			On-site mitigation measures:	
			(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.	
			(2) As part of the characterisation define opportunities for source reduction, as well as reuse and	
			recycling as opposed to simply disposing waste.	
			(3) Ensure segregation of hazardous wastes from non-hazardous.	
			(4) Sealable bins and containers must be made available for the storage of all streams of waste.	
			(5) During the construction phase, temporary storage of construction waste to be stored in a bunded	
			designated area.	Entire Life cycle of project
			(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.	
			(7) All waste materials must be removed off site by a suitable and registered waste service provider.	
			(8) All waste to be disposed off at a suitably registered waste disposal facility.	
			(9) Proof of disposal to be obtained and kept on record.	
			(10) Maintain a waste register for materials removed from site, indicating type, quantity, date, haulage	
			contractor, delivery point, and safe disposal certificates.	
			(11) All waste receptacles to be clearly labelled according to type.	
			(12) Where possible, recyclable waste including glass, paper, and plastic must be separated, stored	
			and recycled where possible.	
			(13) Waste oil and scrap metal should also be recycled if possible.	
			(14) All employees or contractors must be informed about the necessity of using waste drums.	
			(15) No littering will be allowed and a daily site clean-up will be initiated.	
			(16) All domestic refuge 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).	
			(17) Measures to ensure that solid waste is transported as to avoid waste spills enroute must be	

			implemented.	1	
			(18) Waste bins must be emptied on a regular basis as to ensure bins do not overflow.		
			(19) Site should be kept clean and free of rubbish that could potentially attract animal pests and that		
			bins are scavenger proof.		
			(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.		
			(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.		
			Legal requirements:		
			(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA)		
			of 2008 are incorporated in the Waste Management Plan.		
			(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.		
			(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.		
			(4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the		
			National Waste Information System.		
			(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.		
			(6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These		
			requirements should be considered when disposing waste to landfill.		
			(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.		
			(8) All waste tyres generated on site must be managed according to the Waste tyre regulations		
			published under the Environment Conservation Act of 1989.		
7. Water storage	Improper water	Operational	Implementation of EMS:	(1) Develop and implement a water management	
facilities	storage		(1) Water usage monitoring plan to be developed and implemented.	plan specifically addressing the storage of water	
	management		(2) Create awareness of water conservation.	as well as the frequent inspections of storage	
			(3) Regular inspections of water storage facilities.	facilities.	
			(4) Reporting and recording of water management related incidents.		Entire Life cycle of project
			On-site mitigation measures:		
			(1) Filtered or treated water from PCD's 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.		

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			(2) Monitor water usage and ensure that areas of waste are identified and minimised.		
			(3) Where possible, reuse water from the PCD's for dust suppression on the roads.		
			(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.		
			(5) The volume of water abstracted may not exceed the limits stipulated by DWAS by more than 5%		
			on an annual basis.		
			(6) Water storage facilities to be inspected on a weekly basis to ensure no leaks or contamination of		
			water source.		
			(7) Water storage facilities and infrastructures to be maintained to a good working condition at all		
			times.		
			Legal requirements:		
			(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.		
8. Pollution Control	Contamination	Operational	Implementation of EMS:	(1) Develop and implement an Integrated Waste	
Dams (PCD's) i.e.	of water		(1) Development and implementation of a water monitoring program.	Water Management Plan (IWWMP).	
Construction and	resources		(2) Development and implementation of an Integrated Water and Waste Management Plan (IWWMP)	(2) Develop and implement a water monitoring	
operation			(3) Development and implementation of a storm water management plan.	schedule according to the water management	
			(4) Regular inspections of all areas posing a risk of contaminating water resources.	plan.	
9.Stores, workshops			(5) Reporting and recording all related incidents according to a developed procedure.	(3) Ensure compliance with the WUL conditions.	
&wash bays			(6) Develop and implement an emergency preparedness plan.	(4) Develop an emergency preparedness plan	
40.411.41.00.1			(7) Ensuring corrective and preventative actions are taken to address nonconformities.	addressing the prevention and management of	
10. Ablutions & change			(8) Communicating findings of concern to I&AP.	incidents related to water contamination.	
house with sewage			On-site mitigation measures:		
treatment plant			(1) All sources of process water must be identified and quantified for the life cycle of the authorised		
11. Fuel operating			activities.		
power generators			(2) A wastewater management system must be installed complying with regal requirements.		Entire Life cycle of project
power generatore			(3) A water use licence for waste water storage facilities to be obtained.		
13. Fuel storage			(4) All waste water management facilities to be designed by a qualified engineer.		
			(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.		
			(6) No environmentally harmful detergents may be used.		
			(7) Workshops, refuelling depots and washing areas shall be bunded.		
			(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%.		
			(9) Water from wash bays, service areas and fuel storage areas must be discharged into oil		
			separators and sumps.		
			(10) Oils collected in this manner should be retained in a safe holding tank and removed from site by		
			specialist oil recycling company or disposal at approved waste disposal sites.		
			openialist oil recycling company of disposal at approved waste disposal sites.		

(11) No drainage from fuel storage areas to be permitted.	
(12)Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural	
environment.	
(13) Any contaminated storm water and other run-off from dirty areas to be disposed off in the suitably	
designed PCD's.	
(14) Any spill which may contaminate water must be treated according to the approved spill	
management procedure.	
(15) Contain oil or fuel spills in water using an approved oil absorbent fibre.	
(16) Grey water not deemed suitable for dust suppression must be disposed of with other waste water	
in the designated and suitably designed PCD.	
(17) Waste water as well as spilled fuel collected within bunded areas and refuelling areas shall be	
disposed of or treated as hazardous waste.	
(18) Avoid unnecessary alteration of drainage lines.	
(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.	
(20) Contain contaminated runoff from dirty areas (i.e. lay down areas, RoM and product stockpile	
areas, workshops, fuelling bays etc.) in suitable designed PCD's.	
(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.	
(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.	
(23) Do not allow the use of any drainage line or wetland for swimming, bathing, or cleaning of	
clothing, tools or equipment.	
(24) Prevent the discharge of water containing polluting matter or visible suspended materials directly	
into drainage lines or streams.	
(25) Deflect any unpolluted water/runoff away from any dirty area.	
(26) Ensure that no storm water is allowed to enter any drainage installation for the reception,	
conveyance, storage, and or treatment of sewage.	
(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.	
(28) Ensure water passing trough vehicle wash bays and workshops pass through oil separators	
before passing into conservancy tank.	
(29) Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing	
siltation of streams and downstream dams.	
Legal requirements:	
(1) Obtain a Water Use Licence from the DWAS.	

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			Geohydrology –		
			(1) Development of 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).		
			(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 Appendix M) to be included into a		
			monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			(5) 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.		
			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
8. Pollution Control	Smell nuisance	Construction &	Implementation of EMS:	(1) Develop and implement an Integrated Waste	
Dams (PCD's) i.e.		Operational	(1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP).	Water Management plan specifically addressing	
Construction and			(2) Frequent inspections of areas posing a possible risk of causing smell nuisance.	the management of sewage or chemical toilets.	
operation			(3) Development and implementation of an incident response plan.	(2) Develop and implement a Infrastructure	Entire Life cycle of project
			(4) Reporting and recording all related incidents according to a developed procedure.	inspection programme to ensure no leaks or	2.5 5/5.5 5/ 6/5/500
10. Ablutions & change			(5) Develop and implement an emergency preparedness plan.	spillages of sewerage or waste.	
house with sewage			(6) Ensuring corrective and preventative actions are taken to address nonconformities.	(3) Develop and implement a Waste	
treatment plant			(7) Communicating findings of concern to I&AP.	Management plan.	
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			(1) Putrescible waste must be handled, stored, and disposed of before the probability of it generating		
			odours.		
			(2) Chemical toilets must be emptied/ serviced on a regular basis. Proof of this must be obtained and		
			kept on record.		
			(3) Sewage tanks must be emptied on a regular basis. Proof of this must be obtained and kept on		
			record.		
9.Stores, workshops Che	emical Fires	Construction &	Implementation of EMS:	(1) Develop and implement a fire prevention plan	
&wash bays		Operational	(1) Develop and implement a Hazardous substances management plan.	that includes measures of prevention and	
			(2) Develop an emergency procedure addressing in particular the management of chemical fires and	response to chemical fires.	
11. Fuel operating			spill response.	(2) Develop an emergency preparedness	
power generators			(3) Report and record all incidents related to chemical fires.	procedure and include the process to be followed	
13. Fuel storage			(4) Employees must be trained on emergency response procedures required to counter the nature and	in case of a chemical fire.	
13. Fuel Storage			hazards of an accidental release.	(3) Develop a Hazardous substances	
			(5) Employees must be familiar with and have received the appropriate training regarding the handling	management plan.	
			and storage practices, for all containers with which they will come into contact.	(4) Develop a frequent inspection programme to	
			(6) Document the types and amounts of hazardous materials present on the project site (including for	include inspections of hazardous substances	
			example the name and description, classification, regulatory reporting threshold, quantities,	storage facilities.	
			characteristics, analysis of potential consequence, identification of location, details of responsible		
			persons, detail of availability of spill response equipment etc.).		
			(7) The emergency response procedure should 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,		Entire Life cycle of project
			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.		
			(8) Procedures should 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.		
			(9) Ensuring corrective and preventative actions are taken to address nonconformities.		
			(10) Communicating findings of concern to I&AP.		
			On-site mitigation measures:		
			(1) Reactive, flammable, and explosive materials must be managed to avoid uncontrolled reactions or		
			conditions resulting in fire or explosion.		
			(2) Ensure storage of incompatible materials (acids, basis, flammables, oxidisers, reactive chemical) in		
			separate areas, and with containment facilities separating material storage areas.		
			(3) Ensure the provision of material-specific storage for extremely hazardous or reactive materials.		

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	(4) Ensure the use of flame arresting devices on vents from flammable storage containers.	
	(5) Ensure the provision of grounding and lightning protection.	
	(6) Ensure the storage of hazardous materials in an area of the facility separated from the main	
	authorised activities.	
	(7) Ensure that all personnel that use or handle hazardous materials are trained in the use and	
	potential dangers of the materials.	
	(8) Implement all measures detailed in the spill prevention procedure in the event of a spill.	
	(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.	
	(10) Implement management controls (procedures, inspections, communications, 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.	
	(12) Chemical products must be secured when not needed to prevent tampering and vandalism.	
	(13) Provide warning notices, fire fighting facilities and protection from weather damage.	

- (14) Each shift supervisor or safety officer is to report on the integrity of the hazardous material storage.
- (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.
- (16) Label containers so that the hazard nature of the material is clear.
- (17) Obtain Material Safety Data Sheets (MSDS) for all chemicals before use and all materials must be handled according to the instructions.
- (18) Transporters of hazardous materials must ensure that the vehicle is suitable and registered for the purpose it is being used.
- (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 can provide advice in the event of an emergency.
- (20) No combustible material (e.g. wood, rags, carton boxes, etc.) are to be kept in the presence of flammable liquids.
- (21) "No Open Flames" and "No smoking" symbolic signs are to be displayed in the vicinity of the flammable liquid storage areas.
- (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.
- (23) All cables are to be grounded as appropriate.
- (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.
- (25) Flammable liquid stores are to be well ventilated and free of explosive vapours.
- (26) Flammable liquid containers in stores are to be clearly marked or labelled as to their contents.

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			(27) Locations are to support MSDS information and handling/storage instructions.		
			(28) Flammable liquid tanks are to be properly earthed in order to prevent static electricity		
			accumulating.		
			(29) Drainage points on flammable liquid tanks are to be provided with threaded caps or blanking		
			plates.		
			(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.		
			(31) Earting is to be tested regularly (according to safety regulations).		
			<u>Legal requirements</u> :		
			(1) Bulk storage facilities of flammable liquids to be approved by the provincial fire inspector.		
			(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 should be included in the		
			development of the Emergency Response procedure.		
			(3) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of		
			incidents involving Hazardous substances. These requirements should also be included in the		
			Emergency response procedure.		
			(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 should be incorporated into the		
			Hazardous substances management plan.		
			(5) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition		
			of Hazardous chemicals. These requirements should be considered as part of the mine acquisition		
			process.		
			(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 should be incorporated in both the		
			Hazardous substances management plan and the Waste Management plan.		
			(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 should be addressed in the		
			Hazardous substances management plan.		
			(8) All requirements described in the Hazardous substance Act of 1973 should be included in the		
			Hazardous substances management plan.		
			(9) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the		
			National Environmental Management Act.		
			(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.		
			(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.		
12. Lighting	Light pollution	Construction &	Implementation of EMS:	(1) Biennial investigation of the impact of Light	Entire Life cycle of project
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		Operational	(1) Monitor the affects of possible light pollution.	pollution to nocturnal species.	
			On-site mitigation measures:		
			(1) Promote the usage of light sources with a high luminous effectiveness.		
			(2) Promoting the usage of full cut-off lighting fixtures.		
			(3) On-site lights to be spaced appropriately for maximum efficiency.		
			(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).		
			(5) Ensure that during nighttimes only essential lights are switched on.		
			Specialist recommendations:		
			Bat survey -		
			(1) Erect security lights/spot lights only near infrastructure/where absolutely necessary.		
			(2) Mitigate night time noise to as low as possible, particularly during peak foraging times.		
			(3) Restrict blasting activities to daytime hours.		
13. Fuel storage	Emission of	Construction &	Implementation of EMS:	(1) Develop and implement a Hazardous	
	noxious fumes	Operational	(1) Develop and implement a Health and Safety management plan addressing the proper storage,	substance management plan addressing	
			management, handling, and transport of hazardous substances.	adherence to applicable SANS standards for the	
			(2) All personnel to be trained in the handling, storage, management, and transport of hazardous	storage of fuel.	
			substances.	(2) Develop and implement a infrastructure	
			On-site mitigation measures:	inspection schedule and programme and include	
			(1) All personnel should wear issued PPE at all times as indicated by safety signs.	the inspections of fuel storage facilities.	
			(2) Fuel storage facilities should be inspected on a regular basis.	(3) Develop and implement a Health and Safety	
			(3) Facilities should be well ventilated.	Management plan.	
			(4) Spill prevention measures to be implemented at all times.	(4) Develop an Emergency preparedness plan	
			(5) Fire fighting equipment such as fire extinguishers should be made available and be inspected on a	addressing prevention and mitigation of incidents.	
			regular basis.		
			(6) A spill kit should be made available at all time.		Entire Life cycle of project
			(7) All spills to be cleaned immediately.		
			8) Storage facilities should be inspected on a regular basis.		
			(9) All leaks to be repaired immediately.		
			Legal requirements:		
			(1) Bulk storage facilities of flammable liquids to be approved by the provincial fire inspector.		
			(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 should be included in the		
			development of the Emergency Response procedure.		
			(3) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of		
			incidents involving Hazardous substances. These requirements should also be included in the		
			Emergency response procedure.		
			(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 should be incorporated into the
Hazardous substances management plan.
(5) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition
of Hazardous chemicals. These requirements should be considered as part of the mine acquisition
process.
(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 should be incorporated in both the
Hazardous substances management plan and the Waste Management plan.
(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 should be addressed in the
Hazardous substances management plan.
(8) All requirements described in the Hazardous substance Act of 1973 should be included in the
Hazardous substances management plan.
(9) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the
National Environmental Management Act.
(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.
(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.
Specialist recommendations:
(1) Development of 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) (Appendix E)
prior to the commencement of operations.
(2) Controls to reduce emissions from unpaved roads can 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).
(3) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road
per given time
(4) Hauling activities should be strictly restricted to designated hauling routes.
(5) Regular maintenance of the vehicles/trucks (engines) should be undertaken to ensure optimal
efficiency of the engine.
(6) Regular inspections should be carried out on the vehicles/trucks (engines, tyres, etc.) and the
route to ensure both are in good quality.
(7) Engines of the trucks should not be left running whilst not in use.
(8) Clean fuels and fuel efficient vehicles/trucks/mobile equipment should be considered for use where

possible.

14. Employment of workers and procurement of construction materials.	Loss of farm labour	Construction & Operational	Implementation of EMS: (1) Develop and implement a social labour plan. On-site mitigation measures: (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. (2) Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made. Legal requirements: (1) Adherence with the South African Employment act of 2002.	(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	Implementation of EMS: (1) Develop and implement a social labour plan. On-site mitigation measures: (1) The employment of local labour to be promoted. (2) Ensure housing of employees on existing infrastructures. Specialist recommendations: (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. (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. (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. (4) Improve capacity of health services by: (4.1) collaborating with clinics to identify opportunities for assisting with health services, specifically in terms of resources and maintenance issues; (4.2) On-site health facility operational at the onset of construction; (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.		Entire Life cycle of project
	Population Influx – Social Pathologies	Construction & Operational	Implementation of EMS: (1) Develop and implement a social labour plan. (2) Develop a grievance reporting procedure. On-site mitigation measures: (1) Implement HIV/AIDS and substance abuse awareness. (2) Make HIV/AIDS/STD prevention programmes a condition of contract for suppliers/sub-contractors. (3) Control access at site to prevent the presence of sex workers.	(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

		(4) Establish clear rules and regulations for access to the mine site.		
		(5) Work with local health service providers to provide services and health surveys also on substance		
		abuse.		
		(6) Establish liaison structures with local police and local community policing forums.		
		Specialist recommendations:		
		(1) Reduce substance abuse and bad moral choices by conducting substance-abuse prevention		
		education programmes.		
		(2) Establish appropriate recreation facilities, taking special cognisance of workers without families.		
		(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.		
		(4) Develop a peer educator's programme that includes the distribution of condoms and provision of		
		Voluntary Counselling and testing.		
		(5) Increase awareness about lifestyle diseases by providing educational hand-outs for use in local		
		clinics and schools.		
		(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.		
		(7) Develop an awareness programme on lifestyle behaviours including eating habits, exercise, and		
		responsible social choices.		
Population	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
Influx –	Operational	(1) Develop and implement a social labour plan.	as defined by the MRPDA.	
Community		(2) Develop and implement a social development plan.	(2) Develop and implement a grievance lodging	
Conflict		(3) Develop and implement a skills development program.	procedure.	
		On-site mitigation measures:		
		(1) Promote an open and honest relationship with the local community.		Entire Life cycle of project
		(2) Ensure the employment of local labour force and service providers or sub-contractors.		
		(3) Promote community involvement through supporting local development projects.		
		Specialist recommendations:		
		(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.		
		(2) Conduct violence-prevention education programmes.		
Health and	Construction &	Implementation of EMS:	(1) Develop and implement a Health and Safety	
Safety of	Operational	(1) Develop and implement a Health and Safety plan.	Management plan.	
employees		(2) All employees to be trained in health and safety in the work place.		Entire Life cycle of project
		(3) Develop and implement an employee training program.		
		(3) Develop and implement an employee training program.		

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		On-site mitigation measures:		
		(1) Ensure compliance to the relevant Occupational Health and safety act and regulations.		
		(2) All employees or sub-contractors entering site must be inducted to ensure the awareness of the		
		developed health and safety plan.		
		(3) A health and safety representatives to be appointed.		
		(4) Regular inspections and observations of on-site activities shall take place.		
		(5) All incidents to be reported, recorded, investigated, and mitigated.		
		(6) Where required, adequate safety requirements for all areas to be clearly indicated.		
		(7) Employees or sub-contractors must be informed as to what required PPE is applicable in working		
		sections.		
		(8) All site personnel and cub-contractors to be fully equipped with appropriate PPE at all times.		
		(9) Safety signs to be provided in areas considered as high risk zones.		
		(10) Adequate first aid services must be provided.		
		(11) Ongoing health and safety awareness campaigns must be promoted.		
		Legal requirements:		
		(1) Development of a Mine Health and Safety Management plan in accordance with the following		
		legislation:		
		Occupational Health and Safety Act of 2004; and		
		Mine Health and safety Act of 1996.		
		Specialist recommendations:		
		(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.		
		(2) Involvement in awareness campaigns at schools about traffic safety, paraffin, pesticide and		
		domestic fuel-use safety.		
		(3) Reduce injuries on site by managing access control to site.		
		(4) All personnel or visitors to be trained on safety issues before entering site.		
		(5) Reduce occupational sources of injuries and accidents by providing training and regular refresher		
		courses for employees on safety issues.		
		(6) Adhere to the Occupational and Mine Health and safety acts.		
		(7) Form a Safety and health forum to discuss success and failure. These forums meetings to be held		
		on a regular basis.		
Job Creation	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
and Skills	Operational	(1) Develop and implement a social labour plan.	as defined by the MRPDA.	
Training		(2) Develop a grievance reporting procedure.	(2) Develop and implement a grievance lodging	Entire Life cycle of project
		On-site mitigation measures:	procedure.	
		(1) Maximise and monitor local recruitment where required.		
		(2) Consult local labour recruitment offices.		
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			(2) Drayant panation/corruption in local requilibrant structures	I	1
			(3) Prevent nepotism/corruption in local recruitment structures.		
			(4) Promote employment of women and youth.		
			(5) Train locally-recruited construction workers for longer-term employment where possible.		
			(6) Development of a register of local SMMEs.		
			(7) Linkages with skills development/ SMME development institutions.		
			(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR		
			projects.		
			(9) Support economic diversification through development of alternative markets.		
			(10) Collaborate with adjacent mining companies to develop and implement sustainable community		
			projects.		
			Specialist recommendations:		
			(1) Improving financial skills in employees and extended families, and community by conducting socio-		
			economic education programmes and teaching financial skills.		
	Job Creation	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
	(Multiplier	Operational	(1) Develop and implement a social labour plan.	as defined by the MRPDA.	
	affect) and		(2) Develop a grievance reporting procedure.	(2) Develop and implement a grievance lodging	
	Population		On-site mitigation measures:	procedure.	
	Influx		(1) Maximise and monitor local recruitment where required.		
			(2) Consult local labour recruitment offices.		
			(3) Prevent nepotism/corruption in local recruitment structures.		
			(4) Promote employment of women and youth.		Entire Life cycle of project
			(5) Train locally-recruited construction workers for longer-term employment where possible.		
			(6) Development of a register of local SMMEs.		
			(7) Linkages with skills development/ SMME development institutions.		
			(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR		
			projects.		
			(9) Support economic diversification through development of alternative markets.		
			(10) Collaborate with adjacent mining companies to develop and implement sustainable community		
			projects.		
			Operational Phase		
17. Employment of	Loss of farm	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
workers	labour	Operational	(1) Develop and implement a social labour plan.	as defined by the MRPDA.	
			On-site mitigation measures:	(2) Develop and implement a grievance lodging	
			(1) During community engagement/information dissemination, emphasis must be placed on the fact	procedure.	Entire Life cycle of project
			that permanent employment is directly related to the feasibility of the mine operations.		
			(2) Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times		
			be made.		

		<u>Legal requirements:</u>		
		(1) Adherence with the South African Employment act of 2002.		
Population	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
Influx –	Operational	(1) Develop and implement a social labour plan.	as defined by the MRPDA.	
Pressure on		On-site mitigation measures:	(2) Develop and implement a grievance lodging	
Resources		(1) The employment of local labour to be promoted.	procedure.	
		(2) Ensure housing of employees on existing infrastructures.		
		Specialist recommendations:		
		(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.		
		(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.		Entire Life cycle of pro
		(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.		
		(4) Improve capacity of health services by:		
		(4.1) collaborating with clinics to identify opportunities for assisting with health services, specifically in		
		terms of resources and maintenance issues;		
		(4.2) On-site health facility operational at the onset of construction;		
		(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.		
Population	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
Influx – Social	Operational	(1) Develop and implement a social labour plan.	as defined by the MRPDA.	
Pathologies		(2) Develop a grievance reporting procedure.	(2) Develop and implement a grievance lodging	
		On-site mitigation measures:	procedure.	
		(1) Implement HIV/AIDS and substance abuse awareness.	·	
		(2) Make HIV/AIDS/STD prevention programmes a condition of contract for suppliers/sub-contractors.		
		(3) Control access at site to prevent the presence of sex workers.		Entire Life cycle of pr
		(4) Establish clear rules and regulations for access to the mine site.		Litting Elio dyolo di pi
		(5) Work with local health service providers to provide services and health surveys also on substance		
		abuse.		
		(6) Establish liaison structures with local police and local community policing forums.		
		Specialist recommendations:		
		(1) Reduce substance abuse and bad moral choices by conducting substance-abuse prevention		
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		 (2) Establish appropriate recreation facilities, taking special cognisance of workers without families. (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. (4) Develop a peer educator's programme that includes the distribution of condoms and provision of Voluntary Counselling and testing. (5) Increase awareness about lifestyle diseases by providing educational hand-outs for use in local clinics and schools. (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. (7) Develop an awareness programme on lifestyle behaviours including eating habits, exercise, and responsible social choices. 		
Population Influx – Community Conflict	Construction & Operational	Implementation of EMS: (1) Develop and implement a social labour plan. (2) Develop and implement a social development plan. (3) Develop and implement a skills development program. On-site mitigation measures: (1) Promote an open and honest relationship with the local community. (2) Ensure the employment of local labour force and service providers or sub-contractors. (3) Promote community involvement through supporting local development projects. Specialist recommendations: (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. (2) Conduct violence-prevention education programmes.	(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
Health and Safety of employees	Construction & Operational	Implementation of EMS: (1) Develop and implement a Health and Safety plan. (2) All employees to be trained in health and safety in the work place. (3) Develop and implement a employee training program. (4) Keep and maintain a record of all training of employees. On-site mitigation measures: (1) Ensure compliance to the relevant Occupational Health and safety act and regulations. (2) All employees or sub-contractors entering site must be inducted to ensure the awareness of the developed health and safety plan. (3) A health and safety representatives to be appointed. (4) Regular inspections and observations of on-site activities shall take place. (5) All incidents to be reported, recorded, investigated, and mitigated.	(1) Develop and implement a Health and Safety Management plan.	Entire Life cycle of project

		(6) Where required, adequate safety requirements for all areas to be clearly indicated.		
		(7) Employees or sub-contractors must be informed as to what required PPE is applicable in working		
		sections.		
		(8) All site personnel and cub-contractors to be fully equipped with appropriate PPE at all times.		
		(9) Safety signs to be provided in areas considered as high risk zones.		
		(10) Adequate first aid services must be provided.		
		(11) Ongoing health and safety awareness campaigns must be promoted.		
		Legal requirements:		
		(1) Development of a Mine Health and Safety Management plan in accordance with the following		
		legislation:		
		Occupational Health and Safety Act of 2004; and		
		Mine Health and safety Act of 1996.		
		Specialist recommendations:		
		(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.		
		(2) Involvement in awareness campaigns at schools about traffic safety, paraffin, pesticide and		
		domestic fuel-use safety.		
		(3) Reduce injuries on site by managing access control to site.		
		(4) All personnel or visitors to be trained on safety issues before entering site.		
		(5) Reduce occupational sources of injuries and accidents by providing training and regular refresher		
		courses for employees on safety issues.		
		(6) Adhere to the Occupational and Mine Health and safety acts.		
		(7) Form a Safety and health forum to discuss success and failure. These forums meetings to be held		
		on a regular basis.		
Job Creation	Construction &	Implementation of EMS:	(1) Develop and implement a Social Labour plan	
and Skills	Operational		as defined by the MRPDA.	
Training	Орегация		(2) Develop and implement a grievance lodging	
, raining			procedure.	
		(1) Maximise and monitor local recruitment where required.	procedure.	
		(2) Consult local labour recruitment offices.		
		(3) Prevent nepotism/corruption in local recruitment structures.		Entire Life cycle of project
		(4) Promote employment of women and youth.		
		(5) Train locally-recruited construction workers for longer-term employment where possible.		
		(6) Development of a register of local SMMEs.		
		(7) Linkages with skills development/ SMME development institutions.		
		(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR		
		projects.		
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			(9) Support economic diversification through development of alternative markets.		
			(10) Collaborate with adjacent mining companies to develop and implement sustainable community		
			projects.		
			Specialist recommendations:		
			(1) Improving financial skills in employees and extended families, and community by conducting socio-		
			economic education programmes and teaching financial skills.		
	Job Creation	Construction &	Implementation of EMS:		
	(Multiplier	Operational	(1) Develop and implement a social labour plan.		
	affect) and		(2) Develop a grievance reporting procedure.		
	Population		On-site mitigation measures:		
	Influx		(1) Maximise and monitor local recruitment where required.		
			(2) Consult local labour recruitment offices.		
			(3) Prevent nepotism/corruption in local recruitment structures.		
			(4) Promote employment of women and youth.		Entire Life cycle of project
			(5) Train locally-recruited construction workers for longer-term employment where possible.		
			(6) Development of a register of local SMMEs.		
			(7) Linkages with skills development/ SMME development institutions.		
			(8) Explore opportunities for collaboration with other mining/electricity enterprises on LED/CSR		
			projects.		
			(9) Support economic diversification through development of alternative markets.		
			(10) Collaborate with adjacent mining companies to develop and implement sustainable community		
			projects.		
18.Topsoil and subsoil	Dust	Construction	Implementation of EMS:	(1) Development and implementation of a Dust	
stripping & stockpiling	generation		(1) Development of a dust fallout monitoring plan.	management plan as part of a Air quality	
for mining operation			(2) Frequent Inspections of areas prone to dust generation.	management plan to including the monitoring and	
area			(3) Reporting and recording incidents related to air quality.	prevention programme.	
10 Open cost mining			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	(2) Ensuring compliance with the National	
19.Opencast mining			(5) Communicating findings of concern to I&AP.	Environmental Management: Air Quality Act	
excavations			On-site mitigation measures:	(NEMAQA), No. 39 of 2004 as amended by Act	
20.Drilling & Blasting			(1) Construction activities to take place under the supervision of an environmental representative	no 20 of 2014.	Entire Life cycle of project
			(2) Set the on-site speed limit to 40km/h for gravel roads and 50km/h for tar roads.	(3) Ensure activities remain under the thresholds	
21. RoM & product			(3) Develop and implement a dust suppression schedule.	stipulated in GNR 893 (in terms of section 21 of	
stockpiling			(4) Biodegradable and environmentally friendly flocculent (approved by the environmental control	NEMAQA.	
			officer/environmental officer/ SHEQ officer) may be used as dust suppressant.	(4) Register online to the National Atmospheric	
22. Residue stockpiles			(5) Wetting of stockpile areas.	Emissions Inventory System (NAEIS) in terms of	
23. Screening			(6) Covering loads with tarpaulin when transporting ROM, product, or any material in order to prevent	the National Reporting Regulations (GNR 283) as	
Operations			dust generation.	Group C emitters.	
Operations					



24. Discard disposal
(backfilling of mining
area)

- 30. Vehicular activity on haul roads; and operation of mining equipment
- 31. Bulk transporting of Ore to market on Public roads

- (7) Disturbed areas no longer used for mining related activities shall be re-vegetated immediately.
- (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.

Legal requirements:

- (1) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting Regulations (GNR 283) as Group C emitters.
- (2) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).
- (3) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013).
- (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 should form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.

Specialist recommendations:

- (1) Development of 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) (**Appendix E**) prior to the commencement of operations.
- (2) Implementation of recommended dust control methods as stipulated in Table 6-1 of the BAQIAR (Appendix E).
- (3) Dust generated from material handling operations and mining operations can be significantly reduced by wet suppression with the use of water sprays.
- (4) The combined use of water sprays with chemical surfactants provide more extensive wetting making it a more affective technique than water suppression alone.
- (5) The loading, transfer, and discharge of materials should take place with a minimum height of fall and be shielded against the wind.
- (6) Controls to reduce emissions from unpaved roads can 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).
- (7) All positive and negative effects of the different methods of dust suppression should be considered and the best feasible and successful option must be implemented.
- (8) Wind erosion from stockpiles and open areas can be minimised through the use of water sprays, wind breaks, vegetation and enclosures.
- (9) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road per given time
- (10) Hauling activities should be strictly restricted to designated hauling routes.
- (11) Regular maintenance of the vehicles/trucks (engines) should be undertaken to ensure optimal efficiency of the engine.
- (12) Regular maintenance of hauling routes and surface improvements (where necessary) should be

- (5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009)
- (6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)



area	(3) Reporting and recording incidents related to degradation of soil resources.	plan.
	(4) Ensuring corrective and preventative actions are taken to address nonconformities.	(3) Development and implementation of
19.Opencast mining	(5) Communicating findings of concern to I&AP.	vehicle/plant/equipment maintenance plan with
excavations	(6) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	specific reference to daily inspections of
	compliance with GN R. 1147 of NEMA.	plant/vehicles/equipment for leaks or breakages.
20.Drilling & Blasting	On-site mitigation measures:	,
21. RoM & product	(1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area.	
stockpiling	(2) Do not mix sub-soil with topsoil and fertile soils.	
	(3) Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material).	
22. Residue stockpiles	(4) Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the	
	stockpiles with indigenous, non-invasive vegetation.	
23. Screening	(5) Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood	
Operations	lines.	
24. Discard disposal	(6) Implement storm water control measures on topsoil and fertile soil stockpiles.	
(backfilling of mining	(7) Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from	
area)	erosion.	
,	(8) Rehabilitation of areas after the completion of works to take place as soon as possible.	
25. Waste generation,	(9) Avoid over exposing un-vegetated areas as far as possible.	
storage and disposal	Legal requirements:	
26. Chemical Toilets	(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.	
20. Chemical Tollets	(2) The Conservation of Agriculture Resources Act (Act no. 107 of 1998) requires the protection of	
29. Storage of fuel and	land against soil erosion and the prevention of water logging and silinization of soils by means of	
lubricants in temporary	suitable soil conservation works to be constructed and maintained. These requirements should form	
facilities	part of the Soil Conservation and Stockpile management plan.	
	Specialist recommendations:	
33. Rehabilitation of	(1) Strip all usable soil, irrespective of soil depth.	
mining areas	(2) Implement live placement of soil where possible, improve organic status of soils, maintain fertility	
	levels and curb topsoil loss.	
	(3) Implement surface digital terrain mapping to ensure surface water control measures are	
	implemented to ensure free draining system with minimal soil erosion.	
	(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.	
	(5) Loss of agricultural land due to opencast mining is a temporary loss which can be mitigated by	
	appropriate backfilling and re-placement of stockpiled topsoil. If done correctly, most of the original	
	agricultural potential will be restored.	
	(6) An Environmental Coordinator must manage environmental impacts in coordination with	
	construction and operation schedule.	
	(7) In the event that contractors are to be appointed these contractors to sign and undertake	

	1		anyimmental compliance		-
			environmental compliance.		
			(8) Keep disturbed areas and stockpiles to minimum to prevent soil loss.		
			(9) Identify suitable areas to stockpile stripped soil.		
			(10) Prevent surface runoff and seepage on site from contaminating stockpiled soils and stripped		
			areas.		
			(11) Minimise soil erosion through wind and water		
			(12) Remediate and rehabilitate disturbed areas in accordance with development plan		
18.Topsoil and subsoil	Vegetation and	Construction &	Implementation of EMS:	(1) Develop a plant species search and rescue	
stripping & stockpiling	habitat loss	Operational	(1) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	management plan.	
for mining operation			compliance with GN R. 1147 of NEMA.	(2) Development of Mine Rehabilitation,	
area			(2) Develop and implement a plant species search and rescue management plan.	decommissioning and mine closure liability Plan	
			(3) Regular inspection of sensitive areas.	in compliance with GN R. 1147 of NEMA.	
19.Opencast mining			(4) A soil conservation and stockpiling plan to be developed and implemented.	(3) Develop and implement a soil conservation	
excavations			(5) Reporting and recording incidents related to unnecessary clearance of vegetation.	management plan.	
24 PoM 9 product			(6) Ensuring corrective and preventative actions are taken to address nonconformities.	(4) Apply for permits to remove protected species	
21. RoM & product			(7) Communicating findings of concern to I&AP.	(provincial and national).	
stockpiling			(8) Record keeping of all removed/relocated species.		
22. Residue stockpiles			On-site mitigation measures:		
			(1) Avoid clearing areas outside the development footprint.		
33. Rehabilitation of			(2) Avoid development in sensitive environments such as areas within pristine or valuable ecological		
mining areas			significance.		
			(3) Before the commencement of any vegetation clearance, a search and rescue operation should		
			take place identifying possible protected species as well as indigenous species.		Entire Life cycle of project
			(4) An area should be identified to re-instate protected and indigenous areas.		
			(5) If feasible an onsite nursery should be established and maintained.		
			Legal requirements:		
			(1) Section 28 of NEMA describes the duty of care and remediation of environmental damage.		
			(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.		
			(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.		
			Specialist recommendations:		
			Terrestrial Ecology –		
			(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.		
			(2) Themeda triandra – Diheteropogon amplectens Grasslands (High sensitivity rating – Avoid		
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ar possible)		
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- (2.1) Development in Grasslands should be limited to the absolute minimum, aiming for minimal to no alteration of the habitat configuration.
- (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.
- (2.3) Components of the proposed development that should under no circumstance be located in this vegetation would include:
- (2.3.1) Buildings and/or ablution facilities;
- (2.3.2) Any form of waste/soil/overburden disposal or stockpiling
- (2.3.3) Tailings dams or processing plants; and
- (2.3.4) Any form of storage of materials or machinery.
- (3) Cyperus sexangularis Flueggea virosa Riparian Vegetation (No Go Area only suitable crossings permissible)
- (3.1) Development in this vegetation/habitat and at least 50 m beyond should be limited to crossings of access roads only, aiming for minimal to no alteration of the habitat configuration.
- (3.2) Mining/development in this vegetation/habitat is strongly discouraged.
- (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.
- (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.
- (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.
- (3.6) Components of the proposed development that may under no circumstance be located in or within 100 m of any drainage would include:
- (3.6.1) Buildings and/or ablution facilities;
- (3.6.2) Any form of waste/soil/overburden disposal or stockpile;
- (3.6.3) Tailings dams or processing plants; and
- (3.6.4) Any form of storage of materials or machinery
- (4) Acacia tortilis Dichrostachys cinerea Dry Mixed Bushveld (Medium Low sensitivity)
- (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.
- (4.2) Community members should 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.
- (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.
- (4.4) Mine management of the Spitsvale Project 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 should be done to break the sealed upper surface and reduce sheet erosion:

- (4.4.1) With a Ripper only, rip sections of up to 5 m wide along the contour, alternating with \pm 5 m of bushveld as it is;
- (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;
- (4.4.3) If possible, hand-collected seeds from surrounding areas should be re-introduced to the rips;
- (4.4.4) Use the cleared thorn bushes to loosely brush-pack the area with the branching side facing upslope
- (5) Kirkia wilmsii Terminalia prunioides variable Bushveld (Medium-High sensitivity Avoid as far possible)
- (5.1) Mining/development in this vegetation/habitat should be limited to the absolute minimum, aiming for minimal alteration of the habitat configuration.
- (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.
- (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.
- (5.4) After decommissioning, it will be important to facilitate the re-establishment of a diverse vegetation layer as soon as possible.
- (6) Hippobromus pauciflorus Rhoicissus tridentata Rock Outcrops (High sensitivity Treat as No Go Areas as far possible)
- (6.1) Same requirements as stipulated under (5).
- (7) Combretum hereroense Euclea sekhukhuniensis low bushveld (No Go, only limited access roads permissible)
- (7.1) Mining/development in this vegetation/habitat is strongly discouraged, aiming for no alteration of the habitat.
- (7.2) Adjacent (upstream) areas also need to be cleared with care, ensuring that no excessive runoff is directed toward the donga plains.
- (7.3) Although current dongas may be relatively old and stable, new and accelerated erosion must be monitored and mitigated at all times.
- (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.
- (8) Rehabilitate and re-vegetate all areas that have been disturbed as soon as practically possible.
- (9) Continually monitor the progress/success of rehabilitation efforts and adapt if rehabilitation targets are not met in acceptable timeframes
- (10) As part of decommissioning, all stockpiles must be entirely obliterated and landscaped to merge

to the control of the	
into the surroundings.	
(11) Keep main internal access route as planned along existing gravel roads.	
(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:	
(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;	
(12.2) Protected trees, succulents and geophytes: must be relocated (trees as far as feasible);	
(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.	
(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.	
(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.	
(15) Create designated turning areas and strictly prohibit any off-road driving or parking of vehicles	
and machinery outside designated areas.	
(16) Keep the clearing of natural veldt to a minimum.	
(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.	
(20) All remaining material of cleared shrubs and trees must be shredded and used as mulch.	
(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	
can (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.	
(21) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive	
Management plan (Appendix E of the Biodiversity Impact Report (Appendix G to this report)).	
Avifauna –	
(1) Leave, as far as possible, as much of the natural indigenous bush undisturbed and in its pristine	
sate.	
(2) Route connecting roads as close as is possible to already developed sites or roads.	
(3) Restrict or prohibit any off-road driving in areas of pristine indigenous bush.	
(4) Route power lines along these connecting roads, or if possible route them underground.	
Bat Survey –	
(1) Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely	
necessary.	
(2) Discourage vehicles from driving through the natural vegetation were mining activities are not	
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			taking place.		
1			(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.		
			(4) Prohibit any chemical and/or heavy metal from being released into the environment.		
			(5) Manage all waste water and stormwater to prevent pollution to water bodies.		
			(3) Manage an waste water and stormwater to prevent politition to water bodies.		
18.Topsoil and subsoil	Destruction of	Construction &	Implementation of EMS:	(1) Develop and implement a water management	
stripping & stockpiling	Wetlands	Operational	(1) Develop a water monitoring management plan.	plan and specifically include the conservation	
for mining operation			(2) Record and report all incidents related to affecting water quality.	measures to be implemented in wetland areas.	
area			(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	(2) Ensure compliance with the issued WUL	
			compliance with GN R. 1147 of NEMA.	requirements.	
			(4) Ensuring corrective and preventative actions are taken to address nonconformities.		
			(5) Communicating findings of concern to I&AP.		
1			(6) Development and implementation of a storm water management plan.		
			(7) Regular inspection of erosion prone areas for signs of erosion.		
			(8) Create awareness of water conservation and protection of wetlands.		
			On-site mitigation measures:		
			(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.		
			(2) In the event that a wetland will be altered, mitigation measures to reduce the impact on the wetland		
			must be strictly monitored.		
			(3) Ensure water quality complies with the requirements stipulated by the Water Use Licence		Entire Life cycle of project
			conditions.		
			(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.		
			(5) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to		
			prevent the formation of erosion dongas or rills.		
			(6) Species of ecological importance to be searched and rescued and reinstated during rehabilitation.		
			Legal requirements:		
			(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.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of 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).		
			(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 Appendix M) to be included into a		
			monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			(5) 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.		
			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
18.Topsoil and subsoil	Hydrocarbon	Construction &	Implementation of EMS:	(1) Development of water management plan	
stripping & stockpiling	Contamination	Operational	(1) Develop and implement a Hazardous substances management plan addressing handling, storage,	addressing monitoring and management	
for mining operation			and transport of hazardous substances.	requirements.	
area			(2) Develop and implement an emergency response procedure addressing the procedure in case of a	(2) Development of a storm water management	
19.Opencast mining			chemical spill. This procedure should ensure the fastest possible reaction to spills or accidents as well	plan addressing the separation of "dirty" and	
excavations			as addressing remediation procedures.	clean "areas"	Entire Life cycle of project
- CAOUTULIOIIS			(3) Development and implementation of an incident reporting procedure.	(3) Development of emergency response plan	
20.Drilling & Blasting			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	with specific reference to spill prevention and	
			(5) Communicating findings of concern to I&AP.	remediation.	
21. RoM & product			On-site mitigation measures:	(4) Development and implementation of	
stockpiling			(1) Fuel to be stored in above ground storage tanks or sealed containers.	vehicle/plant/equipment maintenance plan with	
			(2) Hazardous substances to be stored within a bund area with a sump drainage.	specific reference to daily inspections of	
	-				



	(3) Bunded areas to be designed to contain at least 110% of the storing capacity. plant/vehicles/equipment for leaks or breakages.
23. Screening	(4) All spills (minor and major) must be cleaned and remediated to the satisfaction of the appointed (5) Development and implementation of a
Operations	environmental representative or the Department within 24 hours. Hazardous substances management plan.
24. Discard disposal	(5) Any spillages on site to be excavated to the visible depth of impact and disposed of for removal to
(backfilling of mining	a registered hazardous waste disposal site. Alternative in-situ remediation techniques may be used.
	(6) On site spill kits or absorbent materials must be readily available. These kits must include materials
area)	to absorb, breakdown, and where possible encapsulate minor material spillages.
27. River crossings	(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
29. Storage of fuel and	ensure the collection of any hydrocarbons.
ubricants in temporary	(8) All vehicles, plant, and equipment must be inspected on a daily basis. Records to be made
facilities	available for these inspections.
	(9) Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment
30. Vehicular activity on	(where possible leaks may occur) when not in use.
haul roads; and	(10) All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil
operation of mining	leakages.
equipment	(11) Leaking equipment shall be removed and repaired immediately from site to facility designated for
	repairs.
	Legal requirements:
	(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 should be included in the
	development of the Emergency Response procedure.
	(2) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of
	incidents involving Hazardous substances. These requirements should also be included in the
	Emergency response procedure.
	(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 should be incorporated into the
	Hazardous substances management plan.
	(4) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition
	of Hazardous chemicals. These requirements should be considered as part of the mine acquisition
	process.
	(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 should be incorporated in both the
	Hazardous substances management plan and the Waste Management plan.
	(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 should be addressed in the
	Hazardous substances management plan.
	(7) All requirements described in the Hazardous substance Act of 1973 should be included in the
	Hazardous substances management plan.

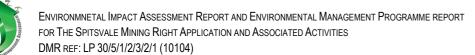


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			(8) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the		
			National Environmental Management Act.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of an environmental monitoring 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).		
			(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 Appendix M) to be included into a		
			monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
18.Topsoil and subsoil	Sedimentation	Construction &	Implementation of EMS:	(1) Develop a storm water management plan.	
stripping & stockpiling	and siltation of	Operational	(1) Development and implementation of water quality monitoring plan.	(2) Develop and implement a water management	
for mining operation	watercourses		(2) Development and implementation of an incident reporting procedure.	plan and specifically include water monitoring and	
area			(3) Ensuring corrective and preventative actions are taken to address nonconformities.	pollution prevention strategies.	
			(4) Communicating findings of concern to I&AP.		
19.Opencast mining			(5) Development and implementation of a storm water management plan.		
excavations			(6) Regular inspection of erosion prone areas for signs of erosion.		
			(7) A soil conservation and stockpiling plan to be developed and implemented.		Entire Life cycle of project
21. RoM & product					
stockpiling			On-site mitigation measures: (1) Avoid stockpiling meterial within drainage lines or in the 1:10 year fleed line		
22. Residue stockpiles			(1) Avoid stockpiling material within drainage lines or in the 1:10 year flood line.		
			(2) Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas.		
23. Screening			(3) Prevent the discharge of water containing polluting matter or visible suspended materials directly		
Operations			into drainage lines or streams.		
			(4) Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas,		
24. Discard disposal		1	workshops, lay down areas etc.		



(backfilling of mining	(5) Water from excavations or mining areas either through seepage or collection to be pumped and
area)	discharge into a pollution control dam.
	(6) Before any water is permitted to enter natural drainage lines, the quality of water must comply with
27. River crossings	the standards contained in the Water Use Licence conditions.
30. Vehicular activity on	(7) River crossings shall be designed by a registered civil engineer.
haul roads; and	(8) Measures to avoid or prevent erosion formation must be incorporated into the designs of the
operation of mining	infrastructure associated with the river crossings.
	(9) During construction through drainage lines, the majority of the flow must be allowed to pass down
equipment	the stream. In stream diversions should be used rather than the construction of new channels.
32. Water Management	Legal requirements:
	(1) A Water Use Licence to be obtained for all river crossings or development of infrastructure within or
33. Rehabilitation of	within close proximity to a watercourse as defined by the National Water Act, act no of 1996.
mining areas	(2) Requirements stipulated by GN R. 704 to be considered in the final site layout plan by the
	appointed engineers.
	Specialist recommendations:
	Geohydrology –
	(1) Development of 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).
	(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 Appendix M) to be included into a
	monthly/quarterly monitoring programme.
	(4) The parameters to be analysed should 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),).
	Hydrology –
	(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix
	L). Additional sampling points have been recommended and should be included in the final water
	monitoring plan.
	(2) 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 with
	the approval of DWAS.
	(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan
	for metals.
	(4) A conceptual storm water management plan (Appendix L) has been developed based on the
	requirements of GN R. 704 of the National Water Act of 1998.
	(5) Implementation 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 should be consulted during the detailed design phase.		
18.Topsoil and subsoil	Water level	Construction &	Implementation of EMS:	(1) Develop and implement a water management	
stripping & stockpiling	reduction and	Operational	(1) Develop a water monitoring management plan.	plan and specifically include measures to be	
or mining operation	contamination		(2) Record and report all incidents related to affecting water quality.	implemented to reduce the impact on surface and	
rea			(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	groundwater reduction.	
			compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to	(2) Ensure compliance with the issued WUL	
27. River crossings			reinstatement of drainage lines.	requirements.	
8. Water supply			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	(3) Develop and implement a storm water	
octable & process)			(5) Communicating findings of concern to I&AP.	management plan and specifically address the	
potable & process,			(6) Development and implementation of a storm water management plan.	diversion of "clean" water into the natural	
32. Water Management			(7) Regular inspection of erosion prone areas for signs of erosion.	drainage lines.	
			(8) A soil conservation and stockpiling plan to be developed and implemented.		
			(9) Create awareness of water conservation.		
			On-site mitigation measures:		
			(1) River crossings or storm water channels shall be designed by a registered civil engineer.		
			(2) Measures to avoid or prevent erosion formation must be incorporated into the designs of the		
			infrastructure associated with the river crossings.		
			(3) During construction through drainage lines, the majority of the flow must be allowed to pass down		
			the stream. In stream diversions should be used rather than the construction of new channels.		
			(4) Filtered or treated water from PCD's may be used for dust suppression should they conform to the		Entire Life cycle of proje
			sediment load requirements or other quality requirements as specified by the Water Use Licence		
			issued by the Department of Water Affairs and sanitation.		
			(5) Monitor water usage and ensure that areas of waste are identified and minimised.		
			(6) Where possible, reuse water from the PCD's for dust suppression on the roads.		
			(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.		
			Legal requirements:		
			(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.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of 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).		



	<u> </u>	<u> </u>	(2) A number of receites (i.e. bareledes and auf		T
			(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 Appendix M) to be included into a		
			monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			(5) 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.		
			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
18.Topsoil and subsoil	Noise	Construction &	Implementation of EMS:	(1) Develop and implement a noise monitoring	
stripping & stockpiling	generation	Operational	(1) Development and implementation of a Acoustical Measurement & Audit Programme as part of the	programme to ensure compliance with the	
for mining operation			EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F).	National Noise Control Regulations and	
area			(2) Recording, reporting, and remediating incidents related to noise.	SANS10103:2008 guidelines.	
			(3) Regular inspections of plant.	(2) Develop and implement a	
19.Opencast mining			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	vehicle/plant/equipment management plan to	Before and during all
excavations			(5) Communicating findings of concern to I&AP.	specifically include routine inspections and	phases on a quarterly basis.
20 Drilling 9 Blooting			On-site mitigation measures:	testing of sound frequencies.	,
20.Drilling & Blasting			(1) Limit the maximum speed on the haul roads to 60 km/h or less. Road speeds should be kept as		
21. RoM & product			consistent as is feasibly possible (i.e. no speed bumps to reduce noise or stop junctions). This will		
stockpiling			help minimise the use of air brakes as well as reduce required maximum capacity of heavy vehicles		
			during pull off.		
23. Screening	1		(2) Roads should be planned so as to reduce heavy vehicles reversing when collecting or dumping at		



Operations			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.		
24. Discard disposal			(3) Regular inspections and servicing of plant.		
(backfilling of mining			Legal requirements:		
area)			(1) Compliance with the National Noise control regulations.		
			Specialist recommendations:		
30. Vehicular activity on			(1) Design an Acoustical Measurement & Audit Programme. Note: If there are no noise-sensitive		
haul roads; and			receptors within 1,000m from any mining activities no routine noise monitoring will be required.		
operation of mining			(2) If feasible the road should be paved or asphalted (e.g. continuous graded asphalt). From an		
equipment			acoustical perspective paver bricks should not be considered. It is likely that routes will be unpaved.		
22 Dahahilitatian of			The developer should consider maintain these unpaved routes regularly smoothing out irregularities		
33. Rehabilitation of			on the routes.		
mining areas			on the routes.		
18.Topsoil and subsoil	Destruction of	Construction &	Implementation of EMS:	(1) Ensure compliance with the National Heritage	
stripping & stockpiling	graves	Operational	(1) Develop and implement an awareness campaign on the protection of social heritage impacts.	Resources Act (NHRA), No. 25 of 1999.	
for mining operation			On-site mitigation measures:	(2) Ensure compliance with the Human Tissue	
area			(1) If human remains are uncovered during the course of authorised activities or archaeological work,		
			the excavations affecting the burial must be stopped.		
			(2) SAHRA should 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.		
			(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.		
			(4) A suitable accredited archaeologist must be appointed on a watching brief to monitor the		
			excavation of any grave sites.		Entire Life cycle of project
			(5) At the onset of construction or mining operations, all graves that might be affected should be		Entire Elie dyole of project
			clearly demarcated and if possible fenced off to protect them from any accidental damage, whether		
			they are earmarked for relocation, or not.		
			(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.		
			(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.		
			Legal requirements:		
			(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).		
			Specialist recommendations:		

		T	Land of the second of the seco		T
			(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage		
			Impact Assessment (HIA) report attached as Appendix O).		
			(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 can be made.		
			Homestead sites –		
			(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.		
			(4) It is recommended that the sites are retained, and that it should 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.		
			(5) If the sites cannot be retained, it should be documented (mapped and excavated) by an		
			archaeologists after obtaining a permit from SAHRA.		
			(6) 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.		
			Informal burial sites –		
			(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.		
			(8) If the burial places are retained, it should 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.		
			(9) If the graves cannot be retained, it should be relocated, but only on condition of following the		
			correct procedures (see Appendix 3 of the HIA attached as Appendix 0).		
18.Topsoil and subsoil	Degradation of	Construction &	Implementation of EMS:	(1) Ensure compliance with the National Heritage	
stripping & stockpiling	cultural	Operational	(1) Develop and implement an awareness campaign on the protection of social heritage impacts.	Resources Act (NHRA), No. 25 of 1999.	
for mining operation	significance		On-site mitigation measures:	(2) Ensure compliance with the Human Tissue	
area	heritage sites		(1) The position of known sites, as identified by the heritage impact assessment, must be clearly		
	Herringe error		identified and marked and considered in the final site lay out.		
			(2) Such areas shall be market as no-go areas.		
			(3) Artefacts may not be removed under any circumstances.		
			(4) Do not disturb, deface, destroy or remove protected features and sites, whether fenced or not for		Entire Life cycle of project
			the duration of the authorised activity, unless on the approval of the competent authority.		Entire Life cycle of project
			(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.		
			(6) Works must be stopped immediately should any elements of cultural or heritage significance be		
			found.		
			(7) Do not resume works in the area in question without the required permits or authorisation from the		
			competent authority.		
			(8) A qualified and registered archaeologist must be appointed and consulted at such finding to		
			(0) // qualified and registered archaeologist must be appointed and consulted at such linding to		

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			appropriately excavate any artefacts in agreement with the Limpopo Heritage Resource Agency		
			(LPHRA) and the SAHRA.		
			Legal requirements:		
			(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).		
			Specialist recommendations:		
			(1) Identified heritage resource sites must be avoided as far as possible (see Table 2 in the Heritage		
			Impact Assessment (HIA) report attached as Appendix O).		
			(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 can be made.		
			Homestead sites –		
			(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.		
			(4) It is recommended that the sites are retained, and that it should 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.		
			(5) If the sites cannot be retained, it should be documented (mapped and excavated) by an		
			archaeologists after obtaining a permit from SAHRA.		
			(6) 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.		
			Industrial/Infrastructural heritage –		
			(7) A single site defined as of industrial/infrastructural heritage was identified.		
			(8) It is recommended that the irrigation system should be documented (photographed and mapped) in		
			before mining activities takes place.		
18.Topsoil and subsoil	Erosion	Construction &	Implementation of EMS:	(1) Development and implementation of a storm	
stripping & stockpiling		Operational	(1) Development and implementation of a storm water management plan.	water management plan.	
for mining operation			(2) Regular inspection of erosion prone areas for signs of erosion.	(2) Development of a soil conservation	
area			(3) A soil conservation and stockpiling plan to be developed and implemented.	management plan.	
19.Opencast mining			(4) Monthly monitoring of water quality (as per recommendation of specialist study).	(3) Development of Mine Rehabilitation,	
excavations			(5) Reporting and recording incidents related to erosion.	decommissioning and mine closure liability Plan	Entire Life cycle of project
GACAVALIONS			(6) Ensuring corrective and preventative actions are taken to address nonconformities.	in compliance with GN R. 1147 of NEMA.	
21. RoM & product			(7) Communicating findings of concern to I&AP.		
stockpiling			On-site mitigation measures:		
			(1) Soil conservation measures to be implemented on stockpiles to prevent erosion. This could include		
24. Discard disposal			the use of erosion control fabric or non-invasive grass seeding.		
(backfilling of mining			(2) All areas susceptible to erosion must be identified and protection measures be implemented.		
	1	l l			•



area)	(3) Retain natural trees, shrubbery and grass species where possible.	
urou)	(4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to	
27. River crossings	be implemented, specifically when excavations or disturbances takes place within river banks, or the	
	river bed.	
30. Vehicular activity on	(5) Formation of erosion channels ("dongas") to be prevented by applying soil erosion control and	
haul roads; and	bank stabilisation procedures as specified by a qualified environmental specialist.	
operation of mining	(6) Erosion formation beyond rills must be avoided.	
equipment	(7) Erosion damages to be repaired as soon as possible and no later than the target set by the	
20 W-4 M	Management team.	
32. Water Management	(8) Slopes steeper than 1(V):4(H) or slopes where soils are by nature dispersive or erodible must be	
33. Rehabilitation of	stabilised.	
mining areas	(9) Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent	
	erosion from starting on berms.	
	(10) Access routes should not traverse slopes with gradients in excess of 8%.	
	(11) Wherever possible, access routes should avoid crossing drainage lines and riparian zones.	
	(12) Drainage lines should not be altered and should be level with the surrounding land once subsistence has occurred.	
	(13) Run-off from roads must be managed in a way to avoid erosion and prevent pollution.	
	Legal requirements:	
	(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.	
	(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 silinization of soils by means of	
	suitable soil conservation works to be constructed and maintained. These requirements should form	
	part of the Soil Conservation and Stockpile management plan.	
	Specialist recommendations:	
	Hydrology – (1) A concentral starm water management plan (Annendix I) has been developed based on the	
	(1) A conceptual storm water management plan (Appendix L) has been developed based on the	
	requirements of GN R. 704 of the National Water Act of 1998. (2) Implementation 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 should be consulted during the detailed design phase.	
	Soil –	
	(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.	
	(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;	
	(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);	

			 (4) Implement surface digital terrain mapping to ensure surface water control measures are implemented to ensure free draining system with minimal soil erosion. (5) Minimise soil erosion through wind and water Biodiversity – Also see Vegetation and Habitat loss (1) Limit the complete removal of vegetation. (2) Limit work outside the proposed footprint. (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. (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). 		
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 ₂ emissions	Construction & Operational	Implementation of EMS: (1) Develop and maintain a carbon footprint reporting policy. (2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant. On-site mitigation measures: (1) Plant and equipment to function at an optimal level. (2) Where possible lead replacement petrol to be used. (3) Where possible low sulphur containing diesel to be used. (4) All vehicles and equipment must be maintained and serviced according to the manufacturer's specification. (5) Any vehicle, plant or equipment emitting visible emissions from their exhaust systems must be serviced or repaired immediately. Legal requirements: (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 should form part of the Air quality Management Plan and the Vehicle/Plant/Equipment maintenance plan.	(1) Develop and maintain a Carbon footprint reporting policy. (2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.	Entire Life cycle of project
18.Topsoil and subsoil stripping & stockpiling	Alteration of drainage	Construction & Operational	Implementation of EMS: (1) Develop a water monitoring management plan.	(1) Develop and implement a storm water management plan.	Entire Life cycle of project



for mining operation	patterns	(2) Record and report all incidents related to affecting water quality. (2) Develop and implement a water management	
area		(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in plan specifically including a strategy for the	
		compliance with GN R. 1147 of NEMA. management of alterations to drainage patterns.	
19.Opencast mining		(4) Ensuring corrective and preventative actions are taken to address nonconformities.	
excavations		(5) Communicating findings of concern to I&AP.	
22. Residue stockpiles		(6) Development and implementation of a storm water management plan.	
22. Residue Stockpiles		(7) Regular inspection of erosion prone areas for signs of erosion.	
27. River crossings		(8) A soil conservation and stockpiling plan to be developed and implemented.	
_		On-site mitigation measures:	
32. Water Management		(1) Plan the final site layout in a manner as to reduce alteration of drainage patterns.	
		(2) In the event that drainage patterns will be altered, the natural flow to be diverted.	
		(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation	
		and sedimentation.	
		(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence	
		conditions.	
		(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.	
		(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to	
		prevent the formation of erosion dongas or rills.	
		Legal requirements:	
		(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.	
		Specialist recommendations:	
		Geohydrology –	
		(1) Development of 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).	
		(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 Appendix M) to be included into a	
		monthly/quarterly monitoring programme.	
		(4) The parameters to be analysed should 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),).	
		(5) 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.	



			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
18.Topsoil and subsoil	Destruction of	Construction &	Implementation of EMS:	(1) Develop and implement a storm water	
stripping & stockpiling	upstream	Operational	(1) Develop a water monitoring management plan.	management plan.	
for mining operation	tributaries and		(2) Record and report all incidents related to affecting water quality.	(2) Develop and implement a water management	
area	reduction in		(3) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	plan specifically including a strategy for the	
10 Openeast mining	water in the		compliance with GN R. 1147 of NEMA, addressing the rehabilitation measures related to	management of alterations to drainage patterns.	
excavations	catchment		reinstatement of drainage lines.		
excavations			(4) Ensuring corrective and preventative actions are taken to address nonconformities.		
32. Water Management			(5) Communicating findings of concern to I&AP.		
			(6) Development and implementation of a storm water management plan.		
			(7) Regular inspection of erosion prone areas for signs of erosion.		
			(8) A soil conservation and stockpiling plan to be developed and implemented.		Entire Life cycle of project
			On-site mitigation measures:		
			(1) Plan the final site layout in a manner as to reduce the destruction of upstream tributaries.		
			(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.		
			(3) Any diversions to be in such a manner as to avoid erosion formation or pollution through siltation		
			and sedimentation.		
			(4) Ensure water quality complies with the requirements stipulated by the Water Use Licence		
			conditions.		
			(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.		
			(6) Ensure rehabilitation measures are according to rehabilitation plan and that measures are taken to		
			·	•	

			prevent the formation of erosion dongas or rills.		
			Legal requirements:		
			(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.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of 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).		
			(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 Appendix M) to be included into a		
			monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			(5) 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.		
			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
18.Topsoil and subsoil	Influx of alien	Construction &	Implementation of EMS:	(1) Develop and implement an alien eradication	Entire Life cycle of project



stripping & stockpiling	invasive	Operational	(1) Development and implementation of an alien and invasive control plan	and control management plan.
for mining operation	vegetation		(2) Awareness training on the identification of weeds and alien species to employees responsible for	
area			the management of these species.	
			On-site mitigation measures:	
19.Opencast mining			(1) Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to	
excavations			prevent re-growth.	
21. RoM & product			(2) All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and	
stockpiling			weeds.	
stockpining			(3) Chemical removal shall be used in accordance with the manufacturer's specification for weeds	
33. Rehabilitation of			where mechanical eradication/control is no longer affective.	
mining areas			(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.	
			(5) Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to	
			be manually removed from site.	
			(6) The herbicide consultant must have a Pest Control Operators licence.	
			(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.	
			Legal requirements:	
			(1) Adherence to requirements stipulated by GN R. 598 of NEMBA.	
			(2) Section 3: Category 1b Listed Invasive Species (A total number of 6 species were identified	
			- Appendix G):	
			(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.	
			(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.	
			(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.	
			(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.	
			(3) Section 4. Category 2 Listed Invasive Species (One specie has been identified - Agave	
			sisalana):	
			(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.	
			(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.	
			(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.
(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.
(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.
(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.
(4) Section 5. Category 3 Listed Invasive Species (One specie has been identified – Morus
alba):
(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.
(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.
(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.
(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.
(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.
(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.
Specialist recommendations:
(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.
(3) If filling material is to be used, this should be sourced from areas free of invasive species
(4) Monitor the establishment of (alien) invasive species and remove as soon as detected, whenever

(5) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive

Management plan (Appendix E of the Biodiversity Impact Report (Appendix G to this report)).



19.Opencast mining	Contamination	Construction &	Implementation of EMS:	(1) Develop and implement an Integrated Waste	
excavations	of water	Operational	(1) Development and implementation of a water monitoring program.	Water Management Plan (IWWMP).	
	resources		(2) Development and implementation of an Integrated Water and Waste Management Plan (IWWMP)	(2) Develop and implement a water monitoring	
20.Drilling & Blasting			(3) Development and implementation of a storm water management plan.	schedule according to the water management	
21. RoM & product			(4) Regular inspections of all areas posing a risk of contaminating water resources.	plan.	
stockpiling			(5) Reporting and recording all related incidents according to a developed procedure.	(3) Ensure compliance with the WUL conditions.	
Stockpilling			(6) Develop and implement an emergency preparedness plan.	(4) Develop an emergency preparedness plan	
22. Residue stockpiles			(7) Ensuring corrective and preventative actions are taken to address nonconformities.	addressing the prevention and management of	
			(8) Communicating findings of concern to I&AP.	incidents related to water contamination.	
23. Screening			On-site mitigation measures:		
Operations			(1) All sources of process water must be identified and quantified for the life cycle of the authorised		
24 Discoud disposal			activities.		
24. Discard disposal			(2) A wastewater management system must be installed complying with regal requirements.		
(backfilling of mining			(3) A water use licence for waste water storage facilities to be obtained.		
area)			(4) All waste water management facilities to be designed by a qualified engineer.		
25. Waste generation,			(5) Wash bays, service areas, and fuel storage areas may not be located within the 1:100 year flood		
storage and disposal			line or horizontal distance of 100 m (whichever is greater) of a watercourse or drainage line.		
			(6) No environmentally harmful detergents may be used.		
26. Chemical Toilets			(7) Workshops, refuelling depots and washing areas shall be bunded.		Entire Life cycle of project
27 Diver erecings			(8) All bunded areas to be constructed in a way as to avoid seepage to the surrounding environment		
27. River crossings			as well as be able to contain its content to a capacity of 110%.		
28. Water supply			(9) Water from wash bays, service areas and fuel storage areas must be discharged into oil		
(potable & process)			separators and sumps.		
			(10) Oils collected in this manner should be retained in a safe holding tank and removed from site by		
29. Storage of fuel and			specialist oil recycling company or disposal at approved waste disposal sites.		
lubricants in temporary			(11) No drainage from fuel storage areas to be permitted.		
facilities			(12)Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural		
20 W-t M			environment.		
32. Water Management			(13) Any contaminated storm water and other run-off from dirty areas to be disposed off in the suitably		
			designed PCD's.		
			(14) Any spill which may contaminate water must be treated according to the approved spill		
			management procedure.		
			(15) Contain oil or fuel spills in water using an approved oil absorbent fibre.		
			(16) Grey water not deemed suitable for dust suppression must be disposed of with other waste water		
			in the designated and suitably designed PCD.		
			(17) Waste water as well as spilled fuel collected within bunded areas and refuelling areas shall be		
			disposed of or treated as hazardous waste.		
			(18) Avoid unnecessary alteration of drainage lines.		
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ROGRAWWE REPORT	
(19) Avoid locating lay down areas, wash bays, workshops etc. within the 1:50 year flood line or within	Τ
horizontal distance of 100 m (whichever is greater) of a water course.	
(20) Contain contaminated runoff from dirty areas (i.e. lay down areas, RoM and product stockpile	
areas, workshops, fuelling bays etc.) in suitable designed PCD's.	
(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.	
(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.	
(23) Do not allow the use of any drainage line or wetland for swimming, bathing, or cleaning of	:
clothing, tools or equipment.	
(24) Prevent the discharge of water containing polluting matter or visible suspended materials directly	
into drainage lines or streams.	
(25) Deflect any unpolluted water/runoff away from any dirty area.	
(26) Ensure that no storm water is allowed to enter any drainage installation for the reception,	
conveyance, storage, and or treatment of sewage.	
(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.	
(28) Ensure water passing trough vehicle wash bays and workshops pass through oil separators	
before passing into conservancy tank.	
(29) Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing	
siltation of streams and downstream dams.	
Legal requirements:	
(1) Obtain a Water Use Licence from the DWAS.	
Specialist recommendations:	
Geohydrology –	
(1) Development of 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).	
(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 Appendix M) to be included into a	
monthly/quarterly monitoring programme.	
(4) The parameters to be analysed should 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),).

(5) 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

	1	T T	area.	I	
			(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major		
			and trace elements) of pumped water.		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan. (2) As part of the monitoring program going forward, samples should be taken monthly for at least the		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
20.Drilling & Blasting	Damage to	Construction &	Implementation of EMS:	(1) Develop and implement a Drilling and Blasting	
20.Drining & Diagoning	surrounding	Operational	(1) Develop and implement a Drilling and Blasting procedure.	procedure.	
	landowner	Oporational	(2) Develop and implement a drilling and blasting monitoring plan.	(2) Develop and implement an emergency	
	properties		(3) Pre and post inspections of possible affected properties.	preparedness plan.	
	proportion		(4) Record keeping of all drilling and blasting activities, clearly indicating time and date of blast.	propared reservation	
			(5) Reporting and recording all related incidents according to a developed procedure.		
			(6) Develop and implement an emergency preparedness plan.		
			(7) Ensuring corrective and preventative actions are taken to address nonconformities.		
			(8) Communicating findings of concern to I&AP.		
			On-site mitigation measures:		
			(1) Ensure the mitigation measure stipulated by the drilling and blasting procedure are implemented.		Entire Life cycle of project
			(2) Ensure the appointment of a suitably qualified blasting supervisor or officer.		
			(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.		
			(4) Special attention must be paid to visible cracks, fallen ground, overhangs, loose material, boulders,		
			fault lines, water seepage, and slip panes.		
			(5) If the area is declared as safe by the Blasting supervisor/officer, then only may blasting activities		
			proceed.		
			(6) If a specific area is deemed as unsafe, the area must be demarcated and the production manager		
			must be notified of the area.		
			(7) Record must be kept of all the inspection reports.		
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	(8) The demarcated area must be made safe before any blasting activities will be allowed to
	commence.
	(9) In the event that attempts made to ensure the safety of demarcated areas, alternative measures
	needs to be implemented or blasting in that specific area should be avoided.
	(10) Only authorised personnel suitably qualified must be allowed to enter designated blasting zones.
	(11) These personnel must be equipped with appropriate PPE at all times.
	(12) The appointed personnel must spend the minimum amount of time to complete their work in
	danger zones.
	(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.
	(14) All machines or equipment working closer than 5 m from a high wall must be fitted with a Fall-on-
	Protection cab.
	(15) Drilling must be done perpendicular to the high wall with the mast between the cab and the high
	wall.
	(16) Drilling closer than 5m from the high wall will be a daylight operation only.
	(17) Only appointed and certified surface blasters will be allowed to blast on surface.
	(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.
	(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.
	(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.
	(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.
	(22) This aforementioned affords affective and safe blast designs with maximum efficiency in terms of
	fragmentation and confined peripheral impacts.
	(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.
	(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" should be declared and the inspector of explosives must be contacted to request a
	"sleep over" of the blast.
	(25) All necessary precautions such as guarding and barricading off must then are implemented.
	(26) No secondary blasting may be carried out at any time that primary blasting operations are being
	conducted.
	(27) No blasting will take place under high-tension electrical cables or near to structures without the
	necessary risk assessments conducted and approvals granted.
	(28) Guards to be posted as specified to prevent any unauthorised entry into a blasting area.

(29) The person in charge will ensure that there are no persons in the vicinity of the blasting area that

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			could be endangered by the blast.		
			(30) Only authorised persons allowed on the pattern, alternatively permission must be obtained from		
			the blast supervisor/officer.		
			(31) All relevant signs and contraband box to be in place at designated entrance to the pattern.		
			(32) The destruction of any explosives must be done according to the specified procedure.		
			Legal requirements:		
			(1) Compliance with the Health and Safety Act (Act 29 of 1996).		
			(2) Compliance to the Mine and Explosives Act, Act no 15 of 2003.		
			Specialist recommendations:		
			(1) Development of 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.		
22. Residue stockpiles	Hazardous	Operational	Implementation of EMS:	(1) Develop and implement a Waste	
25. Waste generation,	Leachate		(1) Design and implement an Integrated Waste Water Management Plan (IWWMP).	Management plan.	
storage and disposal			(2) Develop and implement a water quality management plan.	(2) Develop and implement an Integrated Waste	
			(3) Regular inspections of the waste management areas and/or facilities.	Water Management plan.	
			(4) Reporting and recording all related incidents according to a developed procedure.		
			(5) Develop and implement an emergency preparedness plan.		
			(6) Ensuring corrective and preventative actions are taken to address nonconformities.		
			(7) Communicating findings of concern to I&AP.		
			On-site mitigation measures:		
			(1) Ensure mitigation measures are implemented as to avoid the leachate of hazardous chemicals into		
			the surrounding environment.		
			(2) Implement a ground water monitoring plan and ensure the legal thresholds are not being		
			exceeded.		
			(3) Ensure remediation actions are taken immediately in the formation of hazardous leachates.		Entire Life cycle of project
			(4) Ensure compliance with the issued Waste Management Licence.		
			Legal requirements:		
			(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA)		
			of 2008 are incorporated in the Waste Management Plan.		
			(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.		
			(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.		
			(4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the		
			National Waste Information System.		
			(5) GN R. 635 sets the National norms and standards for the assessment of waste for landfill. The		

	1		procedures for determining the close of waste for landfill must be incorporated into the Waste	I	
			procedures for determining the class of waste for landfill must be incorporated into the Waste		
			Management plan.		
			(6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These		
			requirements should be considered when disposing waste to landfill.		
			(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.		
			(8) All waste tyres generated on site must be managed according to the Waste tyre regulations		
			published under the Environment Conservation Act of 1989.		
			Specialist recommendations:		
			Geohydrology –		
			(1) Development of 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).		
			(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 Appendix M) to be included into a		
			monthly/quarterly monitoring programme.		
			(4) The parameters to be analysed should 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),).		
			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix		
			L). Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
25. Waste generation,	Illegal	Construction &	Implementation of EMS:	(1) Compliance with the National Environmental	
storage and disposal	dumping	Operational	(1) Develop and implement as waste management plan with the focus on reuse, reduce, recycle, or	Management: Waste Act, act no 59 of 2008 and	
			avoid.	associated regulations.	
			(2) Development and maintenance of a waste disposal record keeping system.		
			On-site mitigation measures:		Entire Life cycle of project
			(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.		
			specified in the waste management plan.		

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recycling as opposed to simply disposing waste.
(3) Ensure segregation of hazardous wastes from non-hazardous.
(4) Sealable bins and containers must be made available for the storage of all streams of waste.
(5) During the construction phase, temporary storage of construction waste to be stored in a bunded
designated area.
(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.
(7) All waste materials must be removed off site by a suitable and registered waste service provider.
(8) All waste to be disposed off at a suitably registered waste disposal facility.
(9) Proof of disposal to be obtained and kept on record.
(10) Maintain a waste register for materials removed from site, indicating type, quantity, date, haulage
contractor, delivery point, and safe disposal certificates.
(11) All waste receptacles to be clearly labelled according to type.
(12) Where possible, recyclable waste including glass, paper, and plastic must be separated, stored
and recycled where possible.
(13) Waste oil and scrap metal should also be recycled if possible.
(14) All employees or contractors must be informed about the necessity of using waste drums.
(15) No littering will be allowed and a daily site clean-up will be initiated.
(16) All domestic refuge 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).
(17) Measures to ensure that solid waste is transported as to avoid waste spills en-route must be
implemented.
(18) Waste bins must be emptied on a regular basis as to ensure bins do not overflow.
(19) Site should be kept clean and free of rubbish that could potentially attract animal pests and that
bins are scavenger proof.
(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.
(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.
Legal requirements:
(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA)
of 2008 are incorporated in the Waste Management Plan.
(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.
(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.

			 (4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the National Waste Information System. (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. (6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These requirements should be considered when disposing waste to landfill. (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. (8) All waste tyres generated on site must be managed according to the Waste tyre regulations published under the Environment Conservation Act of 1989. 		
26. Chemical Toilets	Smell nuisance	Construction & Operational	Implementation of EMS: (1) Develop and maintain an Integrated Waste and Water Management Plan (IWWMP). (2) Frequent inspections of areas posing a possible risk of causing smell nuisance. (3) Development and implementation of an incident response plan. (4) Reporting and recording all related incidents according to a developed procedure. (5) Develop and implement an emergency preparedness plan. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (1) Putrescible waste must be handled, stored, and disposed of before the probability of it generating odours. (2) Chemical toilets must be emptied/ serviced on a regular basis. Proof of this must be obtained and kept on record. (3) Sewage tanks must be emptied on a regular basis. Proof of this must be obtained and kept on record.	(1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets. (2) Develop and implement a Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste. (3) Develop and implement a Waste Management plan.	Entire Life cycle of project
28. Water supply (potable & process) 32. Water Management	Improper water storage management	Construction & Operational	Implementation of EMS: (1) Water usage monitoring plan to be developed and implemented. (2) Create awareness of water conservation. (3) Regular inspections of water storage facilities. (4) Reporting and recording of water management related incidents. On-site mitigation measures: (1) Filtered or treated water from PCD's 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. (2) Monitor water usage and ensure that areas of waste are identified and minimised.	(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

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			(3) Where possible, reuse water from the PCD's for dust suppression on the roads.		
			(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.		
			(5) The volume of water abstracted may not exceed the limits stipulated by DWAS by more than 5%		
			on an annual basis.		
			(6) Water storage facilities to be inspected on a weekly basis to ensure no leaks or contamination of		
			water source.		
			(7) Water storage facilities and infrastructures to be maintained to a good working condition at all		
			times.		
			Legal requirements:		
			(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.		
29. Storage of fuel and	Chemical Fires	Construction &	Implementation of EMS:	(1) Develop and implement a fire prevention plan	
lubricants in temporary		Operational	(1) Develop and implement a Hazardous substances management plan.	that includes measures of prevention and	
facilities			(2) Develop an emergency procedure addressing in particular the management of chemical fires and	response to chemical fires.	
			spill response.	(2) Develop an emergency preparedness	
			(3) Report and record all incidents related to chemical fires.	procedure and include the process to be followed	
			(4) Employees must be trained on emergency response procedures required to counter the nature and	in case of a chemical fire.	
			hazards of an accidental release.	(3) Develop a Hazardous substances	
			(5) Employees must be familiar with and have received the appropriate training regarding the handling	management plan.	
			and storage practices, for all containers with which they will come into contact.	(4) Develop a frequent inspection programme to	
			(6) Document the types and amounts of hazardous materials present on the project site (including for	include inspections of hazardous substances	
			example the name and description, classification, regulatory reporting threshold, quantities,	storage facilities.	
			characteristics, analysis of potential consequence, identification of location, details of responsible		
			persons, detail of availability of spill response equipment etc.).		Entire Life cycle of project
			(7) The emergency response procedure should 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.		
			(8) Procedures should 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.		
			(9) Ensuring corrective and preventative actions are taken to address nonconformities.		
			(10) Communicating findings of concern to I&AP.		
			On-site mitigation measures:		
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OCIATED ACTIVITIES	3	
	(1) Reactive, flammable, and explosive materials must be managed to avoid uncontrolled reactions or	
	conditions resulting in fire or explosion.	
	(2) Ensure storage of incompatible materials (acids, basis, flammables, oxidisers, reactive chemical) in	
	separate areas, and with containment facilities separating material storage areas.	
	(3) Ensure the provision of material-specific storage for extremely hazardous or reactive materials.	
	(4) Ensure the use of flame arresting devices on vents from flammable storage containers.	
	(5) Ensure the provision of grounding and lightning protection.	
	(6) Ensure the storage of hazardous materials in an area of the facility separated from the main	
	authorised activities.	
	(7) Ensure that all personnel that use or handle hazardous materials are trained in the use and	
	potential dangers of the materials.	
	(8) Implement all measures detailed in the spill prevention procedure in the event of a spill.	
	(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.	
	(10) Implement management controls (procedures, inspections, communications, 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.	
	(12) Chemical products must be secured when not needed to prevent tampering and vandalism.	
	(13) Provide warning notices, fire fighting facilities and protection from weather damage.	
	(14) Each shift supervisor or safety officer is to report on the integrity of the hazardous material	
	storage.	
	(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.	
	(16) Label containers so that the hazard nature of the material is clear.	
	(17) Obtain Material Safety Data Sheets (MSDS) for all chemicals before use and all materials must	
	be handled according to the instructions.	
	(18) Transporters of hazardous materials must ensure that the vehicle is suitable and registered for	
	the purpose it is being used.	
	(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 can provide advice in the event of an emergency.	
	(20) No combustible material (e.g. wood, rags, carton boxes, etc.) are to be kept in the presence of	
	flammable liquids.	
	(21) "No Open Flames" and "No smoking" symbolic signs are to be displayed in the vicinity of the	
	flammable liquid storage areas.	
	(22) Flammable liquids are to be issued only on a need-to-use-basis and strict control is to be	
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exercised to ensure that persons do not draw more than what is needed for the specific job.



(23) All cables are to be grounded as appropriate.
(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.
(25) Flammable liquid stores are to be well ventilated and free of explosive vapours.
(26) Flammable liquid containers in stores are to be clearly marked or labelled as to their contents.
(27) Locations are to support MSDS information and handling/storage instructions.
(28) Flammable liquid tanks are to be properly earthed in order to prevent static electricity
accumulating.
(29) Drainage points on flammable liquid tanks are to be provided with threaded caps or blanking
plates.
(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.
(31) Earting is to be tested regularly (according to safety regulations).
Legal requirements:
(1) Bulk storage facilities of flammable liquids to be approved by the provincial fire inspector.
(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 should be included in the
development of the Emergency Response procedure.
(3) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of
incidents involving Hazardous substances. These requirements should also be included in the
Emergency response procedure.
(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 should be incorporated into the
Hazardous substances management plan.
(5) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition
of Hazardous chemicals. These requirements should be considered as part of the mine acquisition
process.
(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 should be incorporated in both the
Hazardous substances management plan and the Waste Management plan.
(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 should be addressed in the
Hazardous substances management plan.
(8) All requirements described in the Hazardous substance Act of 1973 should be included in the
Hazardous substances management plan.
(9) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the
National Environmental Management Act.
(10) Requirements stipulated in SANS 10089-1:2008 (above ground storage facilities for petroleum

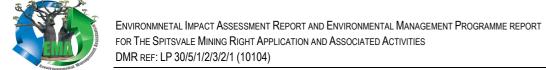
products) must be incorporated into the Hazardous Substance Management plan and be implemented

			on site.		
			(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.		
31. Bulk transporting of	Pressure on	Construction &	Implementation of EMS:	(1) Develop and implement a traffic management	
Ore to market on Public	public	Operational	(1) Develop and implement a traffic management plan.	plan.	
roads	transport		On-site mitigation measures:	(2) Develop and implement a Public Complaints	
	infrastructure		(1) Access roads should be planned so that only minimum linear distances are developed.	procedure.	
			(2) All storm water control mechanisms to be maintained.		
			(3) Clean and repair any damages caused by the haul vehicles to public or private roads.		
			(4) All incidents related to traffic resulting from the authorised activities should be documented and		
			kept in the safety records.		
			(5) Haulage of ROM product should preferably be scheduled off-peak hour traffic times.		
			(6) Allow for safe pedestrian crossings where necessary.		
			(7) Traffic calming measures must be implemented in consultation with the provincial traffic		
			department.		
			(8) Traffic calming measures will be required at points indicated by the Traffic assessment report		
			(Attached as Appendix P).		
			(9) Warning signs must be placed on and around the site as per the Occupational, Health and Safety		
			act requirements.		
			(10) Clearly indicate which activities are to be taken place within which areas of the site using		
			demarcation and/or signage.		Entire Life cycle of proje
			(11) All incidents should be reported to the appointed Health and Safety officer/Manager, investigated,		
			documented, and kept in a safety file (digital or hardcopy).		
			(12) Traffic warning signage must be erected where applicable, along transport routes and access		
			roads.		
			(13) All access roads shall be properly marked.		
			(14) Markers shall show the direction of travel.		
			(15) Roads not being used shall be marked with a "No Entry" sign.		
			(16) Position security lighting so that it does not pose a nuisance to residential properties or tourist		
			facilities or a danger to road users.		
			(17) Warning barricading should be placed around open excavations and should be suitable for		
			varying weather conditions.		
			Specialist recommendations:		
			(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 Appendix P).		
			(2) Providing for exclusive turning lanes on the D1261 / Access to the mine intersection.		
			(3) Provision of lighting of sufficient standards at the intersection of the D2161 / Access Road to the		



35. Demolition /	Hydrocarbon	Decommissioning	BCR Chrome Mine. (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. (5) Provision of road signage and road markings. (6) No on-street pick up/drop offs at the D1261 Road / Access to mine intersection should be allowed (drop-offs / pickup should be done on site). (7) Parking provision should be done for trucks to prevent queuing on the national roads and the D1261. Human Health Aspects- The following measures must be taken to improve road safety: (1) Establish and maintain pictorial road-safety signage in local language and English language (if needed); (2) clearly demarcated pedestrian crossings in appropriate places; (3) descriptions along project roadways directly surrounding project facilities, including conveyor-belt routes if applicable, roadway rerouting areas, heavy equipment crossing areas, etc. (4) Regular vehicle maintenance; (5) adequately trained drivers; and (6) Adherence to speed limit, tracking of vehicles. Decommissioning	(1) Development of water management plan	
related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and vehicles 38. Demolition of PCD's	Contamination		 (1) Develop and implement a Hazardous substances management plan addressing handling, storage, and transport of hazardous substances. (2) Develop and implement an emergency response procedure addressing the procedure in case of a chemical spill. This procedure should ensure the fastest possible reaction to spills or accidents as well as addressing remediation procedures. (3) Development and implementation of an incident reporting procedure. (4) Ensuring corrective and preventative actions are taken to address nonconformities. (5) Communicating findings of concern to I&AP. On-site mitigation measures: 	plan addressing the separation of "dirty" and clean "areas" (3) Development of emergency response plan with specific reference to spill prevention and remediation. (4) Development and implementation of	Entire Life cycle of project
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.			 (1) Fuel to be stored in above ground storage tanks or sealed containers. (2) Hazardous substances to be stored within a bund area with a sump drainage. (3) Bunded areas to be designed to contain at least 110% of the storing capacity. (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. (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. (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. 	vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages. (5) Development and implementation of a Hazardous substances management plan.	

(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.
(8) All vehicles, plant, and equipment must be inspected on a daily basis. Records to be made
available for these inspections.
(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.
(10) All vehicles, plant, and equipment must be well maintained to minimise the risk of fuel and oil
leakages.
(11) Leaking equipment shall be removed and repaired immediately from site to facility designated for
repairs.
Legal requirements:
(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 should be included in the
development of the Emergency Response procedure.
(2) Section 20 of the National Water Act 36 of 1998 describes the procedure for the control of
incidents involving Hazardous substances. These requirements should also be included in the
Emergency response procedure.
(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 should be incorporated into the
Hazardous substances management plan.
(4) Section 21 of the Mine Health and safety Act of 1996 describes the requirements for the acquisition
of Hazardous chemicals. These requirements should be considered as part of the mine acquisition
process.
(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 should be incorporated in both the
Hazardous substances management plan and the Waste Management plan.
(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 should be addressed in the
Hazardous substances management plan.
(7) All requirements described in the Hazardous substance Act of 1973 should be included in the
Hazardous substances management plan.
(8) The storage of hazardous substances must be in compliance with regulation 4 of GN R. 704 of the
National Environmental Management Act.
Specialist recommendations:
Geohydrology –
(1) Development of 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



35. Demolition / removal of portable and	Dust	Decommissioning	year). (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 Appendix M) to be included into a monthly/quarterly monitoring programme. (4) The parameters to be analysed should 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),). **Hydrology** – (1) A number of monitoring sample points have been identified in the Hydrological report (Appendix L). Additional sampling points have been recommended and should be included in the final water monitoring plan. (2) 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 with the approval of DWAS. (3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan for metals. **Implementation of EMS:** (1) Development of a dust fallout monitoring plan.	(1) Development and implementation of a Dust	
			first year of operation. This can be revised to quarterly monitoring if no concerns are highlighted with		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
35. Demolition /	Dust	Decommissioning	Implementation of EMS:		
removal of portable and	generation		(1) Development of a dust fallout monitoring plan.	(1) Development and implementation of a Dust	
related infrastructure			(2) Frequent Inspections of areas prone to dust generation.	management plan as part of an Air quality	
			(3) Reporting and recording incidents related to air quality.	management plan to including the monitoring and	
36. Vehicular activity:			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	prevention programme.	
removal of mobile plant			(5) Communicating findings of concern to I&AP.	(2) Ensuring compliance with the National	
/ equipment and			On-site mitigation measures:	Environmental Management: Air Quality Act	
vehicles			(1) Construction activities to take place under the supervision of an environmental representative	(NEMAQA), No. 39 of 2004 as amended by Act	
07. Del el 196 (1) e e 645 e			(2) Set the on-site speed limit to 40km/h for gravel roads and 50km/h for tar roads.	no 20 of 2014.	
37. Rehabilitation of the			(3) Develop and implement a dust suppression schedule.	(3) Ensure activities remain under the thresholds	
lay down areas			(4) Biodegradable and environmentally friendly flocculent (approved by the environmental control	stipulated in GNR 893 (in terms of section 21 of	Entire Life cycle of project
38. Demolition of PCD's			officer/environmental officer/ SHEQ officer) may be used as dust suppressant.	NEMAQA.	
			(5) Wetting of stockpile areas.	(4) Register online to the National Atmospheric	
39. Demolition of			(6) Covering loads with tarpaulin when transporting ROM, product, or any material in order to prevent	Emissions Inventory System (NAEIS) in terms of	
workshops, waste			dust generation.	the National Reporting Regulations (GNR 283) as	
storage facilities, fuel			(7) Disturbed areas no longer used for mining related activities shall be re-vegetated immediately.	Group C emitters.	
storage facilities etc.			(8) Areas having to be stripped of topsoil for construction purposes must be kept to a minimum and	(5) Ensuring compliance with the National	
			only stripped when work is about to take place.	Ambient Air Quality Standards (GNR 1210 of 24	
			Legal requirements:	December 2009).	
			(1) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the	(6) Ensuring compliance with the National Dust	
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			National Reporting Regulations (GNR 283) as Group C emitters.	Control regulations (GNR 897 of November 2013)	

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	2009).	
	(3) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013).	
	(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 should form part of the Air quality Management Plan and the Vehicle/Plant/Equipment	
	maintenance plan	
	Specialist recommendations:	
	(1) Development of 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) (Appendix E)	
	prior to the commencement of operations.	
	(2) Implementation of recommended dust control methods as stipulated in Table 6-1 of the BAQIAR	
	(Appendix E).	
	(3) Dust generated from material handling operations and mining operations can be significantly	
	reduced by wet suppression with the use of water sprays.	
	(4) The combined use of water sprays with chemical surfactants provide more extensive wetting	
	making it a more affective technique than water suppression alone.	
	(5) The loading, transfer, and discharge of materials should take place with a minimum height of fall	
	and be shielded against the wind.	
	(6) Controls to reduce emissions from unpaved roads can 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).	
	(7) All positive and negative effects of the different methods of dust suppression should be considered	
	and the best feasible and successful option must be implemented.	
	(8) Wind erosion from stockpiles and open areas can be minimised through the use of water sprays,	
	wind breaks, vegetation and enclosures.	
	(9) Implement strict vehicle restrictions such as speed limits, weight and number of trucks on the road	
	per given time	
	(10) Hauling activities should be strictly restricted to designated hauling routes.	
	(11) Regular maintenance of the vehicles/trucks (engines) should be undertaken to ensure optimal	
	efficiency of the engine.	
	(12) Regular maintenance of hauling routes and surface improvements (where necessary) should be	
	undertaken.	
	(13) Regular sweeping and cleaning of tarred/paved road surfaces to prevent the accumulation of dust	
	(14) Immediate clean-up of any spillage of material on the hauling routes.	
	(15) Regular inspections should be carried out on the vehicles/trucks (engines, tyres, etc.) and the	
	route to ensure both are in good quality.	
	(16) All material transported should be covered, where possible, and not left exposed during	
	transportation.	

			(17) Engines of the trucks should not be left running whilst not in use.		
			(18) Clean fuels and fuel efficient vehicles/trucks/mobile equipment should be considered for use		
			where possible.		
			(19) Designated areas for the storage of overburden should be considered and incorporated into the		
			design.		
			(20) Monthly dust fallout monitoring as per the National Dust Control Regulations (2013) and reporting.		
			(21) Monthly PM10 and PM2.5 ambient monitoring and reporting. This is also recommended to obtain		
			baseline concentrations.		
			(22) All main hauling roads should be treated for dust suppression to maintain at least 65% emission		
			reduction efficiency.		
35. Demolition /	Degradation of	Decommissioning	Implementation of EMS:	(1) Development of a soil conservation	
removal of portable and	soil resources	Boschiniosioning	(1) Develop and implement a soil conservation and stockpile management plan.	management plan.	
related infrastructure	5011 1000 u1000		(2) Frequent Inspections of areas prone to degradation.	(2) Development of a storm water management	
			(3) Reporting and recording incidents related to degradation of soil resources.	plan.	
37. Rehabilitation of the			(4) Ensuring corrective and preventative actions are taken to address nonconformities.	(3) Development and implementation of	
lay down areas			(5) Communicating findings of concern to I&AP.	vehicle/plant/equipment maintenance plan with	
			(6) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	specific reference to daily inspections of	
38. Demolition of PCD's			compliance with GN R. 1147 of NEMA.	plant/vehicles/equipment for leaks or breakages.	
39. Demolition of			On-site mitigation measures:		
workshops, waste			(1) All areas to be stripped firstly of topsoil and fertile soils and stockpiled in a designated area.		
storage facilities, fuel			(2) Do not mix sub-soil with topsoil and fertile soils.		
storage facilities etc.			(3) Topsoil and fertile soil to be protected from contamination (i.e. hydrocarbons or infertile material).		
			(4) Topsoil and fertile soil stockpiles to be protected from weathering conditions such as covering the		
			stockpiles with indigenous, non-invasive vegetation.		Entire Life cycle of project
			(5) Avoid stockpiling topsoil and fertile soil stockpiles within drainage lines or within the 1:10 year flood		
			lines.		
			(6) Implement storm water control measures on topsoil and fertile soil stockpiles.		
			(7) Exposed areas to be re-vegetated with indigenous or non-invasive species or protected from		
			erosion.		
			(8) Rehabilitation of areas after the completion of works to take place as soon as possible.		
			(9) Avoid over exposing un-vegetated areas as far as possible.		
			Legal requirements:		
			(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.		
			(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 silinization of soils by means of		
			suitable soil conservation works to be constructed and maintained. These requirements should form		
			part of the Soil Conservation and Stockpile management plan.		
			Specialist recommendations:		
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			(1) Strip all usable soil, irrespective of soil depth.		
			(2) Implement live placement of soil where possible, improve organic status of soils, maintain fertility		
			levels and curb topsoil loss.		
			(3) Implement surface digital terrain mapping to ensure surface water control measures are		
			implemented to ensure free draining system with minimal soil erosion.		
			(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.		
			(5) Loss of agricultural land due to opencast mining is a temporary loss which can be mitigated by		
			appropriate backfilling and re-placement of stockpiled topsoil. If done correctly, most of the original		
			agricultural potential will be restored.		
			(6) An Environmental Coordinator must manage environmental impacts in coordination with		
			construction and operation schedule.		
			(7) In the event that contractors are to be appointed these contractors to sign and undertake		
			environmental compliance.		
			(8) Keep disturbed areas and stockpiles to minimum to prevent soil loss.		
			(9) Identify suitable areas to stockpile stripped soil.		
			(10) Prevent surface runoff and seepage on site from contaminating stockpiled soils and stripped		
			areas.		
			(11) Minimise soil erosion through wind and water		
			(12) Remediate and rehabilitate disturbed areas in accordance with development plan		
35. Demolition /	Erosion	Decommissioning	Implementation of EMS:	(1) Development and implementation of a storm	
removal of portable and	21001011	Boothing		water management plan.	
related infrastructure				(2) Development of a soil conservation	
related illinastructure				management plan.	
36. Vehicular activity:					
			1 (4) Monthly monitoring of water quality (as per recommendation of specialist study).		
removal of mobile plant				(3) Development of Mine Rehabilitation,	
			(5) Reporting and recording incidents related to erosion.	decommissioning and mine closure liability Plan	
removal of mobile plant			(5) Reporting and recording incidents related to erosion.(6) Ensuring corrective and preventative actions are taken to address nonconformities.		
removal of mobile plant / equipment and			(5) Reporting and recording incidents related to erosion.(6) Ensuring corrective and preventative actions are taken to address nonconformities.(7) Communicating findings of concern to I&AP.	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures:	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (1) Soil conservation measures to be implemented on stockpiles to prevent erosion. This could include 	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (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. 	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles 37. Rehabilitation of the			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (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. (2) All areas susceptible to erosion must be identified and protection measures be implemented. 	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (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. (2) All areas susceptible to erosion must be identified and protection measures be implemented. (3) Retain natural trees, shrubbery and grass species where possible. 	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas 38. Demolition of PCD's 39. Demolition of			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (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. (2) All areas susceptible to erosion must be identified and protection measures be implemented. (3) Retain natural trees, shrubbery and grass species where possible. (4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to 	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas 38. Demolition of PCD's 39. Demolition of workshops, waste			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (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. (2) All areas susceptible to erosion must be identified and protection measures be implemented. (3) Retain natural trees, shrubbery and grass species where possible. (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 	decommissioning and mine closure liability Plan	Entire Life cycle of project
removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas 38. Demolition of PCD's 39. Demolition of			 (5) Reporting and recording incidents related to erosion. (6) Ensuring corrective and preventative actions are taken to address nonconformities. (7) Communicating findings of concern to I&AP. On-site mitigation measures: (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. (2) All areas susceptible to erosion must be identified and protection measures be implemented. (3) Retain natural trees, shrubbery and grass species where possible. (4) In areas within close proximity to wetlands, rivers and streams, sedimentation control measures to 	decommissioning and mine closure liability Plan	Entire Life cycle of project

Man.	
	bank stabilisation procedures as specified by a qualified environmental specialist.
	(6) Erosion formation beyond rills must be avoided.
	(7) Erosion damages to be repaired as soon as possible and no later than the target set by the
	Management team.
	(8) Slopes steeper than 1(V):4(H) or slopes where soils are by nature dispersive or erodible must be
	stabilised.
	(9) Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent
	erosion from starting on berms.
	(10) Access routes should not traverse slopes with gradients in excess of 8%.
	(11) Wherever possible, access routes should avoid crossing drainage lines and riparian zones.
	(12) Drainage lines should not be altered and should be level with the surrounding land once
	subsistence has occurred.
	(13) Run-off from roads must be managed in a way to avoid erosion and prevent pollution.
	Legal requirements:
	(1) Section 28 of NEMA relates to the duty of care and remediation of environmental damage.
	(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 silinization of soils by means of
	suitable soil conservation works to be constructed and maintained. These requirements should form
	part of the Soil Conservation and Stockpile management plan.
	Specialist recommendations:
	Hydrology –
	(1) A conceptual storm water management plan (Appendix L) has been developed based on the
	requirements of GN R. 704 of the National Water Act of 1998.
	(2) Implementation 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 should be consulted during the detailed design phase.
	Soil –
	(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.
	(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;
	(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);
	(4) Implement surface digital terrain mapping to ensure surface water control measures are
	implemented to ensure free draining system with minimal soil erosion.
	(5) Minimise soil erosion through wind and water
	Biodiversity – Also see Vegetation and Habitat loss
	(1) Limit the complete removal of vegetation.

(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). 35. Demolition / removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and vehicles 38. Demolition of PCD's 38. Demolition of PCD's 4(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). (1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. (2) Recording, reporting, and remediating incidents related to noise. (3) Regular inspections of plant. (4) Ensuring corrective and preventative actions are taken to address nonconformities. (5) Communicating findings of concern to I&AP. On-site mitigation measures: (1) Limit the maximum speed on the haul roads to 60 km/h or less. Road speeds should 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. Before and	35. Demolition / removal of portable and related infrastructure 38. Demolition of PCD's	General waste generation & Littering	Decommissioning	(3) Regular inspections and servicing of plant. Legal requirements: (1) Compliance with the National Noise control regulations. Specialist recommendations: (1) Design an Acoustical Measurement & Audit Programme. Note: If there are no noise-sensitive receptors within 1,000m from any mining activities no routine noise monitoring will be required. (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. Implementation of EMS: (1) Develop and implement as waste management plan with the focus on reuse, reduce, recycle, or avoid. (2) Development and maintenance of a waste disposal record keeping system. (3) Regular inspections of designated waste management area and/or facilities.	(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.	Entire Life cycle of proj
(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). 35. Demolition / removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and vehicles (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). (4) Ensuring corrective and initiated (erosion management plan required). (1) Develop and implement a noise monitoring programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F). National Noise Control Regulations and SANS10103:2008 guidelines. (2) Recording, reporting, and remediating incidents related to noise. (3) Regular inspections of plant. (4) Ensuring corrective and preventative actions are taken to address nonconformities. (5) Communicating findings of concern to I&AP. On-site mitigation measures: (1) Limit the maximum speed on the half made to 60 km/h or less. Road speeds should be kent as testing of sound frequencies.	workshops, waste storage facilities, fuel			help minimise the use of air brakes as well as reduce required maximum capacity of heavy vehicles during pull off. (2) Roads should 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		Before and during phases on a quarterly b
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	removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and vehicles		Decommissioning	erosion of the track and surrounding areas. Ensure that water flows are never concentrated in any way as soils are highly erodible. (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). Implementation of EMS: (1) Development and implementation of a Acoustical Measurement & Audit Programme as part of the EMS. A monitoring program to be developed based on the specialist recommendations (Appendix F). (2) Recording, reporting, and remediating incidents related to noise. (3) Regular inspections of plant. (4) Ensuring corrective and preventative actions are taken to address nonconformities. (5) Communicating findings of concern to I&AP. On-site mitigation measures:	programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. (2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and	



	(4) Reporting and recording of waste related incidents.
39. Demolition of	(5) Continuous awareness training on Recycling, Reduction, Re-use, and avoidance of waste.
workshops, waste	On-site mitigation measures:
storage facilities, fuel	(1) Characterise and quantify all waste streams associated to the authorised activities in terms of
storage facilities etc.	quantity, hazard, generation frequency and recyclability and define and implement disposal options as
	specified in the waste management plan.
	(2) As part of the characterisation define opportunities for source reduction, as well as reuse and
	recycling as opposed to simply disposing waste.
	(3) Ensure segregation of hazardous wastes from non-hazardous.
	(4) Sealable bins and containers must be made available for the storage of all streams of waste.
	(5) During the construction phase, temporary storage of construction waste to be stored in a bunded
	designated area.
	(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.
	(7) All waste materials must be removed off site by a suitable and registered waste service provider.
	(8) All waste to be disposed off at a suitably registered waste disposal facility.
	(9) Proof of disposal to be obtained and kept on record.
	(10) Maintain a waste register for materials removed from site, indicating type, quantity, date, haulage
	contractor, delivery point, and safe disposal certificates.
	(11) All waste receptacles to be clearly labelled according to type.
	(12) Where possible, recyclable waste including glass, paper, and plastic must be separated, stored
	and recycled where possible.
	(13) Waste oil and scrap metal should also be recycled if possible.
	(14) All employees or contractors must be informed about the necessity of using waste drums.
	(15) No littering will be allowed and a daily site clean-up will be initiated.
	(16) All domestic refuge 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).
	(17) Measures to ensure that solid waste is transported as to avoid waste spills enroute must be
	implemented.
	(18) Waste bins must be emptied on a regular basis as to ensure bins do not overflow.
	(19) Site should be kept clean and free of rubbish that could potentially attract animal pests and that
	bins are scavenger proof.
	(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.
	(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.
	Legal requirements:
	(1) Ensure requirements stipulated in the National Environmental Management: Waste Act (NEMWA)

removal of mobile plant / equipment and vehicles 36. Vehicular activity:	CO₂ emissions	Decommissioning Decommissioning	of 2008 are incorporated in the Waste Management Plan. (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. (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. (4) GN R. 625 sets requirements for a waste producer to register and report waste quantity of the National Waste Information System. (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. (6) GN R. 636 sets the National norms and standards for the disposal of waste for landfill. These requirements should be considered when disposing waste to landfill. (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. (8) All waste tyres generated on site must be managed according to the Waste tyre regulations published under the Environment Conservation Act of 1989. Implementation of EMS: (1) Develop and maintain a carbon footprint reporting policy. (2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant. On-site mitigation measures: (1) Plant and equipment to function at an optimal level. (2) Where possible lead replacement petrol to be used. (3) Where possible low sulphur containing diesel to be used. (4) All vehicles and equipment must be maintained and serviced according to the manufacturer's specification. (5) Any vehicle, plant or equipment emitting visible emissions from their exhaust systems must be serviced or repaired immediate	(1) Develop and maintain a Carbon footprint reporting policy. (2) Develop and maintain a Vehicle/Plant/Equipment maintenance plant.	Entire Life cycle of project
1	and siltation of		(1) Development and implementation of water quality monitoring plan.	(2) Develop and implement a water management	Entire Line by one or project



/ equipment and	watercourses	(2) Development and implementation of an incident reporting procedure.	plan and specifically include water monitoring and
vehicles		(3) Ensuring corrective and preventative actions are taken to address nonconformities.	pollution prevention strategies.
		(4) Communicating findings of concern to I&AP.	
37. Rehabilitation of the		(5) Development and implementation of a storm water management plan.	
lay down areas		(6) Regular inspection of erosion prone areas for signs of erosion.	
		(7) A soil conservation and stockpiling plan to be developed and implemented.	
		On-site mitigation measures:	
		(1) Avoid stockpiling material within drainage lines or in the 1:10 year flood line.	
		(2) Ensure erosion control measures or sediment control measures on stockpiles or in stockpile areas.	
		(3) Prevent the discharge of water containing polluting matter or visible suspended materials directly	
		into drainage lines or streams.	
		(4) Deflect any unpolluted water/runoff away from any dirty areas i.e. stockpile areas, mining areas,	
		workshops, lay down areas etc.	
		(5) Water from excavations or mining areas either through seepage or collection to be pumped and	
		discharge into a pollution control dam.	
		(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.	
		(7) River crossings shall be designed by a registered civil engineer.	
		(8) Measures to avoid or prevent erosion formation must be incorporated into the designs of the	
		infrastructure associated with the river crossings.	
		(9) During construction through drainage lines, the majority of the flow must be allowed to pass down	
		the stream. In stream diversions should be used rather than the construction of new channels.	
		Legal requirements:	
		(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.	
		Specialist recommendations:	
		Geohydrology –	
		(1) Development of 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).	
		(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 Appendix M) to be included into a	
		monthly/quarterly monitoring programme.	
		(4) The parameters to be analysed should 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),).	

			Hydrology –		
			(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix).		
			Additional sampling points have been recommended and should be included in the final water		
			monitoring plan.		
			(2) 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 with		
			the approval of DWAS.		
			(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan		
			for metals.		
			(4) A conceptual storm water management plan (Appendix L) has been developed based on the		
			requirements of GN R. 704 of the National Water Act of 1998.		
			(5) Implementation 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 should be consulted during the detailed design phase.		
37. Rehabilitation of the	Influx of alien	Decommissioning	Implementation of EMS:	(1) Develop and implement an alien eradication	
lay down areas	invasive		(1) Development and implementation of an alien and invasive control plan	and control management plan.	
	vegetation		(2) Awareness training on the identification of weeds and alien species to employees responsible for		
			the management of these species.		
			On-site mitigation measures:		
			(1) Alien vegetation growing on topsoil stockpiles must be removed immediately in a manner as to		
			prevent re-growth.		
			(2) All disturbed areas to be monitored on a regular basis for exotic or invasive plant species and		
			weeds.		
			(3) Chemical removal shall be used in accordance with the manufacturer's specification for weeds		
			where mechanical eradication/control is no longer affective.		
			(4) The type of chemical to be utilised must be determined in consultation with a herbicide consultant		Entire Life cycle of project
			and the Environmental Control Officer/Environmental Officer/SHEQ Officer.		
			(5) Those exotic/invasive plant or weed which cannot be eradicated by means of herbicides, needs to		
			be manually removed from site.		
			(6) The herbicide consultant must have a Pest Control Operators licence.		
			(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.		
			Legal requirements:		
			(1) Adherence to requirements stipulated by GN R. 598 of NEMBA.		
			(2) Section 3: Category 1b Listed Invasive Species (A total number of 6 species were identified		
			- Appendix G):		
			(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.		



(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.

- (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.
- (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.

(3) Section 4. Category 2 Listed Invasive Species (One specie has been identified – Agave sisalana):

- (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.
- (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.
- (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.
- (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.
- (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.
- (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.

(4) Section 5. Category 3 Listed Invasive Species (One specie has been identified – Morus alba):

- (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.
- (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.
- (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.
- $(5) \ When \ using \ herbicides \ and \ pesticides, \ requirements \ stipulated \ in \ section \ 7(2)(a)i) \ of \ the \ Fertilizers,$

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			farm feeds, agricultural remedies, and stock remedies Act of 1947 must be considered.		
			(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.		
			(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.		
			Specialist recommendations:		
			(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.		
			(3) If filling material is to be used, this should be sourced from areas free of invasive species		
			(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.		
			(5) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive		
			Management plan (Appendix E of the Biodiversity Impact Report (Appendix G to this report)).		
37. Rehabilitation of the	Vegetation and	Decommissioning	Implementation of EMS:	(1) Develop a plant species search and rescue	
lay down areas	habitat loss		(1) Development of Mine Rehabilitation, decommissioning and mine closure liability Plan in	management plan.	
			compliance with GN R. 1147 of NEMA.	(2) Development of Mine Rehabilitation,	
			(2) Develop and implement a plant species search and rescue management plan.	decommissioning and mine closure liability Plan	
			(3) Regular inspection of sensitive areas.	in compliance with GN R. 1147 of NEMA.	
			(4) A soil conservation and stockpiling plan to be developed and implemented.	(3) Develop and implement a soil conservation	
			(5) Reporting and recording incidents related to unnecessary clearance of vegetation.	management plan.	
			(6) Ensuring corrective and preventative actions are taken to address nonconformities.	(4) Apply for permits to remove protected species	
			(7) Communicating findings of concern to I&AP.	(provincial and national).	
			(8) Record keeping of all removed/relocated species.		
			On-site mitigation measures:		
			(1) Avoid clearing areas outside the development footprint.		Entire Life cycle of project
			(2) Avoid development in sensitive environments such as areas within pristine or valuable ecological		
			significance.		
			(3) Before the commencement of any vegetation clearance, a search and rescue operation should		
			take place identifying possible protected species as well as indigenous species.		
			(4) An area should be identified to re-instate protected and indigenous areas.		
			(5) If feasible an onsite nursery should be established and maintained.		
			Legal requirements:		
			(1) Section 28 of NEMA describes the duty of care and remediation of environmental damage.		
			(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.		
			of the matter of the transfer entire internal management. Dioditorolly flot (the most) of 2002.		



(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.
Specialist recommendations:
Terrestrial Ecology –
(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.
(2) Themeda triandra – Diheteropogon amplectens Grasslands (High sensitivity rating – Avoid
as far possible)
(2.1) Development in Grasslands should be limited to the absolute minimum, aiming for minimal to no
alteration of the habitat configuration.
(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.
(2.3) Components of the proposed development that should under no circumstance be located in this
vegetation would include:
(2.3.1) Buildings and/or ablution facilities;
(2.3.2) Any form of waste/soil/overburden disposal or stockpiling
(2.3.3) Tailings dams or processing plants; and
(2.3.4) Any form of storage of materials or machinery.
(3) Cyperus sexangularis – Flueggea virosa Riparian Vegetation (No Go Area – only suitable
crossings permissible)
(3.1) Development in this vegetation/habitat and at least 50 m beyond should be limited to crossings of
access roads only, aiming for minimal to no alteration of the habitat configuration.
(3.2) Mining/development in this vegetation/habitat is strongly discouraged.
(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.
(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.
(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.
(3.6) Components of the proposed development that may under no circumstance be located in or
within 100 m of any drainage would include:
(3.6.1) Buildings and/or ablution facilities;
(3.6.2) Any form of waste/soil/overburden disposal or stockpile;
(3.6.3) Tailings dams or processing plants; and
(3.6.4) Any form of storage of materials or machinery

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(4) Acacia tortilis – Dichrostachys cinerea Dry Mixed Bushveld (Medium Low sensitivity)	
(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.	
(4.2) Community members should 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.	
(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.	
(4.4) Mine management of the Spitsvale Project 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 should be done to break the sealed upper surface	
and reduce sheet erosion:	
(4.4.1) With a Ripper only, rip sections of up to 5 m wide along the contour, alternating with \pm 5 m of	
bushveld as it is;	
(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;	
(4.4.3) If possible, hand-collected seeds from surrounding areas should be re-introduced to the rips;	
(4.4.4) Use the cleared thorn bushes to loosely brush-pack the area - with the branching side facing	
upslope	
(5) Kirkia wilmsii – Terminalia prunioides variable Bushveld (Medium-High sensitivity – Avoid	
as far possible)	
(5.1) Mining/development in this vegetation/habitat should be limited to the absolute minimum, aiming	
for minimal alteration of the habitat configuration.	
(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.	
(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.	
(5.4) After decommissioning, it will be important to facilitate the re-establishment of a diverse	
vegetation layer as soon as possible.	
(6) Hippobromus pauciflorus – Rhoicissus tridentata Rock Outcrops (High sensitivity – Treat as	
No Go Areas as far possible)	
(6.1) 0	

- (7) Combretum hereroense Euclea sekhukhuniensis low bushveld (No Go, only limited access roads permissible)
- (7.1) Mining/development in this vegetation/habitat is strongly discouraged, aiming for no alteration of the habitat
- (7.2) Adjacent (upstream) areas also need to be cleared with care, ensuring that no excessive runoff is directed toward the donga plains.

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	(7.3) Although current dongas may be relatively old and stable, new and accelerated erosion must be	
	monitored and mitigated at all times.	
	(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.	
	(8) Rehabilitate and re-vegetate all areas that have been disturbed as soon as practically possible.	
	(9) Continually monitor the progress/success of rehabilitation efforts and adapt if rehabilitation targets	
	are not met in acceptable timeframes	
	(10) As part of decommissioning, all stockpiles must be entirely obliterated and landscaped to merge	
	into the surroundings.	
	(11) Keep main internal access route as planned along existing gravel roads.	
	(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:	
	(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;	
	(12.2) Protected trees, succulents and geophytes: must be relocated (trees as far as feasible);	
	(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.	
	(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.	
	(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.	
	(15) Create designated turning areas and strictly prohibit any off-road driving or parking of vehicles	
	and machinery outside designated areas.	
	(16) Keep the clearing of natural veldt to a minimum.	
	(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.	
	(20) All remaining material of cleared shrubs and trees must be shredded and used as mulch.	
	(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	
	can (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.	
	(21) Adherence to the comprehensive Plant Search and rescue, Re-vegetation and Alien Invasive	
	Management plan (Appendix E of the Biodiversity Impact Report (Appendix to this report)).	
	Avifauna –	
	(1) Leave, as far as possible, as much of the natural indigenous bush undisturbed and in its pristine	

			sate. (2) Route connecting roads as close as is possible to already developed sites or roads. (3) Restrict or prohibit any off-road driving in areas of pristine indigenous bush. (4) Route power lines along these connecting roads, or if possible route them underground. Bat Survey – (1) Conserve as much of the natural vegetation as possible. Only create haul roads that are absolutely necessary. (2) Discourage vehicles from driving through the natural vegetation were mining activities are not taking place. (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. (4) Prohibit any chemical and/or heavy metal from being released into the environment. (5) Manage all waste water and stormwater to prevent pollution to water bodies.	
of 39 Demolition of	Contamination of water esources	Decommissioning	Implementation of EMS: (1) Development and implementation of a water monitoring program. (2) Development and implementation of an Integrated Water and Waste Management Plan (IWWMP) (3) Development and implementation of a storm water management plan. (4) Regular inspections of all areas posing a risk of contaminating water resources. (5) Reporting and recording all related incidents according to a developed procedure. (6) Develop and implement an emergency preparedness plan. (7) Ensuring corrective and preventative actions are taken to address nonconformities. (8) Communicating findings of concern to I&AP. On-site mitigation measures: (1) All sources of process water must be identified and quantified for the life cycle of the authorised activities. (2) A wastewater management system must be installed complying with regal requirements. (3) A water use licence for waste water storage facilities to be obtained. (4) All waste water management facilities to be designed by a qualified engineer. (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. (6) No environmentally harmful detergents may be used. (7) Workshops, refuelling depots and washing areas shall be bunded. (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%. (9) Water from wash bays, service areas and fuel storage areas must be discharged into oil separators and sumps. (10) Oils collected in this manner should be retained in a safe holding tank and removed from site by specialist oil recycling company or disposal at approved waste disposal sites.	Entire Life cycle of project

(11) No drainage from fuel storage areas to be permitted.	
(12)Never hose oil or fuel spills into storm water drain or sewer, or into the surrounding natural	
environment.	
(13) Any contaminated storm water and other run-off from dirty areas to be disposed off in the suitably	
designed PCD's.	
(14) Any spill which may contaminate water must be treated according to the approved spill	
management procedure.	
(15) Contain oil or fuel spills in water using an approved oil absorbent fibre.	
(16) Grey water not deemed suitable for dust suppression must be disposed of with other waste water	
in the designated and suitably designed PCD.	
(17) Waste water as well as spilled fuel collected within bunded areas and refuelling areas shall be	
disposed of or treated as hazardous waste.	
(18) Avoid unnecessary alteration of drainage lines.	
(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.	
(20) Contain contaminated runoff from dirty areas (i.e. lay down areas, RoM and product stockpile	
areas, workshops, fuelling bays etc.) in suitable designed PCD's.	
(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.	
(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.	
(23) Do not allow the use of any drainage line or wetland for swimming, bathing, or cleaning of	
clothing, tools or equipment.	
(24) Prevent the discharge of water containing polluting matter or visible suspended materials directly	
into drainage lines or streams.	
(25) Deflect any unpolluted water/runoff away from any dirty area.	
(26) Ensure that no storm water is allowed to enter any drainage installation for the reception,	
conveyance, storage, and or treatment of sewage.	
(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.	
(28) Ensure water passing trough vehicle wash bays and workshops pass through oil separators	
before passing into conservancy tank.	
(29) Avoid unnecessary cutting roads through river, stream banks as this may lead to erosion causing	
siltation of streams and downstream dams.	
Legal requirements:	
(1) Obtain a Water Use Licence from the DWAS.	
Specialist recommendations:	
<u> </u>	

Geohydrology –	
(1) Development of 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).	
(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 Appendix M) to be included into a	
monthly/quarterly monitoring programme.	
(4) The parameters to be analysed should 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),).	
(5) 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.	
(6) Recording of pit dewatering rates. Initial monthly (and later quarterly) sampling and analysis (major	
and trace elements) of pumped water.	
Hydrology –	
(1) A number of monitoring sample points have been identified in the Hydrological report (Appendix	
L). Additional sampling points have been recommended and should be included in the final water	
monitoring plan.	
(2) 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 with	
the approval of DWAS.	
(3) The monitoring should include the standard analysis of major cations/anions as well as ICP scan	
for metals.	
(4) A conceptual storm water management plan (Appendix L) has been developed based on the	
requirements of GN R. 704 of the National Water Act of 1998.	
(5) Implementation 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 should be consulted during the detailed design phase.	



Environmnetal Impact Assessment Report and Environmental Management Programme report for The Spitsvale Mining permit Application and Associated Activities

DMR REF: LP 30/5/1/2/3/2/1 (10104)

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 17) associated to the mitigation programme.

Table 17: 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, etcetcetc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etcetc)	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, reetc. Objective	rhabilitation standards, end use objectives)
				Construction Phase		



DMR REF: LP	30/5/1/2/3/2/1	(10104)

1. Access and hauling along	Dust generation	Air Quality				
roads i.e. during the construction of roads 2. Site clearing and topsoil		Human Health				 (1) Dust fallout levels at active operational sites do not exceed the pre-determined baseline levels by more than 10%. (2) Zero number of complaints from site staff, surrounding landowners and communities.
stripping for lay down area and all related mining infrastructure 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities 8. Pollution Control Dams (PCD's) i.e.		Topography and Visual Environment	Construction & Operational	Control	Control dust fallout throughout the life cycle of the mining activity.	 (3) Adherence with legal required dust fallout levels. (4) Adherence with 600 mg/m² /day averaged over 30 days in residential areas and 1200 mg/m² /day averaged over 30 days in non-residential areas. (5) No more than two within a year, no two sequential months per dust fallout monitoring site. (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.



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



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	Soil quality		
15. Transport of	Soli quality		
construction			
material, mobile			
plant and			
equipment to the			
site			
16. Use of existing drilled /			



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



mining infrastructure 9.Stores,			
workshops &wash bays			
10. Ablutions & change house with sewage treatment plant	Flora micro- ecosystems		
11. Fuel operating power generators			
13. Fuel storage			



1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 6. Storm water runoff management features 15. Transport of construction material, mobile plant and equipment to the site	Erosion	Loss of fertile soil Micro-ecosystems	Construction & Operational	Control	To prevent any erosion and to provide adequate erosion control measures where required.	 (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 areas. (4) No signs of prolonged exposure of unvegetated areas by lack of implementing rehabilitation measures.
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1. Access and hauling along roads i.e. during the construction of roads	Vegetation and habitat loss	Macro and Micro organisms	Construction & Operational	Remedy	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 unvegetated areas by lack of implementing rehabilitation measures.



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



stripping for lay						(4) No visible signs of erosion damages.
down area and						
all related						
mining						
infrastructure						
6. Storm water						
runoff						
management		Surface Water				
features		Surface water				
10010100						
15. Transport of						
construction						
material, mobile						
plant and						
equipment to the						
site						
1. Access and	Noise					(1) Ensure equivalent A-weighted noise levels
						below 55 dBA at potentially noise-sensitive
hauling along roads i.e. during	generation				Control potential noise	receptors (daytime).
the construction		Surrounding noise quality	Construction &		pollution stemming from the	(2) Ensure equivalent A-weighted noise levels
of roads		quality	Operational	Control	construction of the project	below 45 dBA at potentially noise-sensitive
oi ioaus					Construction of the project	receptors (night-time).
2. Site clearing						(3) Define the noisy areas with a set boundary
and topsoil						ensuring that equivalent A-weighted noise



stripping for lay			levels at this boundary does not exceed 61 dB
down area and			LAleq,24hr. It should be noted that the area
all related			would have to be demarcated as a "controlled
mining			zone" in terms of the NCR;
infrastructure			(4)Ensure that the change in ambient sound
			levels as experienced by Potentially Sensitive
5. Mining offices			Receptors is less than 5 - 7 dBA;
(construction			(5) Ensuring compliance with the National
and operation)			Noise Control Regulations and
i.e. operation of			SANS10103:2008 guidelines. The referencing
training centres,			of the International Finance Corporation (World
offices and			Bank) guidelines for an acceptable sound level
kitchen facilities			in a residential area was also considered.
			iii a residentiai area was also considered.
9.Stores,			
workshops			
&wash bays			
11. Fuel			
operating power			
generators			



1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 6. Storm water runoff management features	Alteration of drainage patterns	Wetland and Aquatic Ecology Surface Water quality	Construction & Operational	Remedy	Remedy the possible effects of alteration to natural drainage lines. Adherence with water quality requirements as set by the Water Use Licence Conditions.	 (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 areas. (4) No signs of degradation of diversion channels or drainage systems.
1. Access and hauling along	Destruction of upstream	Wetland and Aquatic Ecology	Construction & Operational	Domody	Remedy the possible effects	(1) No visible signs of erosion formations such as dongas or rills.
roads i.e. during	tributaries and	Downstream water users	o por autoria.	Remedy	of destruction of upstream tributaries and reduction in the	(2) Sedimentation loads of streams and rivers not to exceed the baseline levels by more than



the construction of roads	reduction in water in the catchment	Surface Water quality			water catchment. Adherence with water quality requirements set by the Water Use Licence Conditions.	10%.(3) Erosion control measures implemented in high risk areas.(4) No signs of degradation of diversion channels or drainage systems.
1. Access and hauling along roads i.e. during the construction of roads	Water usage for dust suppression	Wastage of water resource	Construction & Operational	Control	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.
1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Construction	Control	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.



infrastructure						
5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities						
1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure	CO ₂ emissions & Release of noxious gasses	Air Quality	Construction & Operational	Control	The levels of greenhouse gas and CO2 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.	 (1) All vehicles, plant, and equipment to be serviced as per manufacturer's maintenance schedules. (2) Record keeping of service records of all vehicles, plant, and equipment. (3) No evidence of plant, equipment or vehicles in bad condition.



9.Stores, workshops &wash bays 11. Fuel operating power generators 15. Transport of construction material, mobile plant and equipment to the site						
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure	Topography and visual alteration	Topography and Visual Environment	Construction	Remedy	Remedy alteration of the visual environment and topography as close as possible to the predetermined state.	 (1) No areas left un-vegetated. (2) No signs of alien or invasive species on site. (3) Control of visual effects. (4) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.



5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities						
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 16. Use of existing drilled / new boreholes	Water level reduction and contamination	Groundwater quality Downstream water users Surface Water quality	Construction & Operational	Control	Control the potential water level reduction and contamination related to authorised activities.	 (1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%. (2)Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. (3) No incidents related to the pollution of rivers and streams. (4) No visible signs of erosion damages. (5) No signs of blockages to the natural flow of the associated river catchment.
2. Site clearing and topsoil stripping for lay	Destruction of graves	Loss of heritage resources	Construction & Operational	Avoid	Identification of all possible sites of archaeological value and graves has been identified prior to the	(1) All sites clearly demarcated as no-go areas.(2) Evidence of records should further discoveries be identified during construction.(3) Full compliance to all mitigation measures.



down area and all related mining					commencement of authorised work.	
infrastructure						
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure	Degradation of cultural significance heritage sites	Loss of heritage resources	Construction & Operational	Avoid	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 should further discoveries be identified during construction. (3) Full compliance to all mitigation measures.
4. Onsite Clinic	Medical Waste generation	Human Health	Construction & Operational	Control	Properly manage all medical waste resulting from first aid incidents.	(1) No incidents related to miss management of medical waste.
4. Onsite Clinic 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	Electricity usage	CO₂ emissions	Operational	Control	Control and monitor the carbon footprint of the Spitsvale project.	(1) Annual reduction of the Carbon footprint.



12. Lighting 4. Onsite Clinic 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	Domestic water usage	Wastage of water resource	Operational	Avoid	Avoid wastage of water resources. Maintain all infrastructures associated to the management of domestic water.	(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. (2) No visible signs of leaks or damage to water storage infrastructures.
5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	General waste generation & Littering	Visual Environment Soils quality due to leachates Surface Water quality due to leachates	Construction & Operational	Control	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.(2) No unpleasant odours.(3) Marked and sealable bins observed.(4) Evidence of waste disposal certificates.
7. Water storage	Improper water	Wastage of water resource	Operational	Avoid	Avoid the wastage of water	(1) Abstraction from natural watercourses is



8. Pollution	Contamination	Water contamination			Full compliance to the water abstraction limits provided by DWAS. Ensure maintenance of infrastructure related to water usage and storage. Avoid the release of pollutants	DWAS Water Use Licence provisions by more than 5% on an annual basis. (2) No visible signs of leaks or damage to water storage infrastructures.
Control Dams (PCD's) i.e. Construction and operation	of water resources	Wetlands and Aquatic Ecology	Operational		into the aquatic environment. Waste water is appropriately managed. Erosion is	(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.(2) No evidence of pollutants released into streams and rivers.
9.Stores, workshops &wash bays 10. Ablutions & change house		Surface Water quality	ορειαιιο ι ιαι	Avoid	prevented. Suitable water management facilities and treatment works are developed and maintained.	 (3) No formation of erosion gullies or rills. (4) No leaks or spills caused by inadequate waste water management facilities. (5) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.



with sewage treatment plant 11. Fuel operating power generators 13. Fuel storage		Groundwater quality				
8. Pollution Control Dams (PCD's) i.e. Construction and operation 10. Ablutions & change house with sewage treatment plant	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) PCD's containing putrescrible waste to be monitored and kept free of odour.(3) All putrescrible waste removed and disposed off in a suitable manner.
9.Stores, workshops &wash bays	Chemical Fires	Human health and safety environment	Construction & Operational	Avoid	Avoid and prevent chemical fires. Hazardous spills are	(1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels.



					prevented and no incidents to	(2) Immediate removal and remediation of all
11. Fuel		Loss of			human health occur.	spills.
operating power		ecosystems				(3) All staff trained.
generators						(4) All hazardous substances are documented.
13. Fuel storage						(5) No incidents recorded involving chemical
		Damage to				fires.
		property				(6) Reporting of all section 30 of NEMA and
						section 20 of the National Water Act incidents.
12. Lighting	Light pollution	Disruption in ecosystem especially nocturnal fauna species	Construction & Operational	Control	Limit the possible contribution to light pollution as far as reasonably possible.	(1) No signs of usage of light during nigh times, if not essential for the safety of operation or humans.
13. Fuel storage	Emission of noxious fumes	Air Quality	Construction &		Avoid the release of emissions	(1) No leaks from bulk fuel storage facilities.
13. I del storage		•	Operational	Operational Avoid	of noxious fumes from fuel	(2) No incidents relating to damage to lungs
		Human Health			storage facilities.	and eyes of employees or sub-contractors.
14. Employment of workers and procurement of construction	Loss of farm labour	Socio-economic	Construction & Operational	Control	Promoting open public communication in terms of required labour.	 (1) No complaints from local landowners regarding loss of farm labour. (2) Peaceful negotiations regarding employment opportunities.
materials.	Population Influx – Pressure on Resources	Socio-economic	Construction & Operational	Control	Promoting the management of population influx associated to the mining operations in a sustainable manner.	(1) Provision of existing housing infrastructures.



Population Influx – Social Pathologies	Socio-economic	Construction & Operational	Control	Control convicting social pathologies.	(1) Continuous awareness training on HIV/AIDS/STD in collaboration with local health service providers.
Population Influx – Community Conflict	Socio-economic	Construction & Operational	Control	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.
Health and Safety of employees	Human health and safety environment	Construction & Operational	Control	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.
Job Creation and Skills Training	Socio-economic	Construction & Operational	Control	Promote job creation and skills development of local employment.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.
Job Creation (Multiplier	Socio-economic	Construction & Operational	Control	Promote job creation and skills development of local employment.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.



	affect) and					
	Population					
	Influx					
Operational Phase						
17. Employment of workers	Loss of farm					(1) No complaints from local landowners regarding loss of farm labour.
		Socio-economic	Construction & Operational	Control	Promoting open public communication in terms of required labour.	(2) Peaceful negotiations regarding employment opportunities.
						opportunities.
	Population Influx – Pressure on Resources	Socio-economic	Construction & Operational	Control	Promoting the management of population influx associated to the mining operations in a sustainable manner.	(1) Provision of existing housing infrastructures.
Population Influx – Social Pathologies	Influx – Social	Socio-economic	Construction & Operational	Control	Control convicting social pathologies.	(1) Continuous awareness training on HIV/AIDS/STD in collaboration with local health service providers.
	Population Influx – Community Conflict	Socio-economic	Construction & Operational	Control	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.



Health and Safety of employees	Human health and safety environment	Construction & Operational	Control	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.
Job Creation and Skills Training	Socio-economic	Construction & Operational	Control	Promote job creation and skills development of local employment.	(1) Peaceful negotiations regarding employment, skills development, and financial provisions for social development projects.
Job Creation (Multiplier affect) and Population Influx	Socio-economic	Construction & Operational	Control	Promoting open public communication in terms of required labour.	(1) No complaints from local landowners regarding loss of farm labour. (2) Peaceful negotiations regarding employment opportunities.



18.Topsoil and subsoil stripping & stockpiling for mining operation area	Dust generation	Air Quality			Control dust fallout throughout the life cycle of	 (1) Dust fallout levels at active operational sites do not exceed the predetermined baseline levels by more than 10%. (2) Zero number of complaints from site staff,
19.Opencast mining excavations 20.Drilling & Blasting 21. RoM &		Human Health	Construction	Control	the mining activity.	surrounding landowners and communities. (3) Adherence with legal required dust fallout levels. (4) Adherence with 600 mg/m² /day averaged over 30 days in residential areas



product			and 1200 mg/m² /day
stockpiling			averaged over 30 days in
			non-residential areas.
22. Residue			(5) No more than two within
stockpiles			a year, no two sequential
00.0			months per dust fallout
23. Screening			monitoring site.
Operations			(6) If exceeding dust fallout
24. Discard			standard, within 3 months
disposal			after submission of a dust
(backfilling of			fallout monitoring report,
mining area)	Topography and		develop and submit a dust
,	Visual Environment		management plan to the air
30. Vehicular			quality officer for approval.
activity on haul			
roads; and			
operation of			
mining			
equipment			
04 D II			
31. Bulk			
transporting of			
Ore to market on			
Public roads			



18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling 22. Residue stockpiles	Alteration of the visual environment and topography Topography Visual Environme		Remedy	Remedy alteration of the visual environment and topography as close as possible to the predetermined state.	(1) No areas left unvegetated. (2) No signs of alien or invasive species on site. (3) Control of visual effects. (4) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.
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18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations	Degradation of soil resources Soil quality	Construction & Operational	Remedy	Adequate protection of soil resources and remediation if degradation cannot be avoided.	 (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.
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ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES DMR REF: LP 30/5/1/2/3/2/1 (10104)

20.Drilling & Blasting				
21. RoM &				
stockpiling				
22. Residue				
stockpiles				
23. Screening				
Operations	Flora micro-			
24. Discard	ecosystems			
disposal				
(backfilling of				
mining area)				
25. Waste				
generation,				
storage and				
disposal				
26. Chemical				
Toilets				



29. Storage of				
fuel and				
lubricants in				
temporary				
facilities				
33.				
Rehabilitation of				
mining areas				



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18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling 22. Residue stockpiles 33. Rehabilitation of mining areas	Vegetation and habitat loss	Macro and Micro organisms Fauna and Flora	Construction & Operational	Remedy	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) No unauthorised activities outside of the proposed footprint. (5) Avoid activities in No-Go areas as identified in Appendix G.
18.Topsoil and subsoil stripping & stockpiling for mining operation	Destruction of Wetlands	Wetlands and Aquatic Ecology	Construction & Operational	Avoid	Avoid the destruction of wetlands.	(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%.



area						(2)Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. (3) No incidents related to the pollution of rivers and streams. (4) No visible signs of erosion damages.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 20.Drilling & Blasting	Hydrocarbon Contamination	Surface Water quality Groundwater quality	Construction & Operational	Control	Adequate protection of soil and water resources. Active remediation in case of spill is ensured.	(1) No evidence of hydrocarbon and hazardous spills. (2) No release of contaminated water into the natural environment. (3) Immediate removal and remediation of all spills. (4) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.



21. RoM & product stockpiling	Wetlands and Aquatic Ecology			
23. Screening				
Operations				
24. Discard				
disposal				
(backfilling of				
mining area)				
27. River				
crossings				
29. Storage of	Soil Quality			
fuel and				
lubricants in				
temporary				
facilities				
30. Vehicular				
activity on haul				
roads; and				
operation of				



mining equipment						
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology	Construction & Operational	Control	Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation.	(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%. (2)Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. (3) No incidents related to the pollution of rivers and streams. (4) No visible signs of erosion damages.



	I			1	
22. Residue					
stockpiles					
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						
18.Topsoil and subsoil stripping & stockpiling for mining operation area 27. River crossings	Water level reduction and contamination	Groundwater quality Downstream water users	Construction & Operational	Control	Control the potential water level reduction and contamination related to authorised activities.	(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%. (2) Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. (3) No incidents related to
28. Water supply (potable & process) 32. Water		Surface Water quality				the pollution of rivers and streams. (4) No visible signs of erosion damages. (5) No signs of blockages to



Management						the natural flow of the
						associated river catchment.
						(6) Reporting of all section
						30 of NEMA and section 20
						of the National Water Act
						incidents.
40.7						(1) Ensure equivalent A-
18.Topsoil and	Noise					weighted noise levels below
subsoil stripping	generation					55 dBA at potentially noise-
& stockpiling for						sensitive receptors
mining operation						(daytime).
area						(2) Ensure equivalent A-
19.Opencast						weighted noise levels below
mining					45 dBA at potentially noise-	
excavations					Control Control potential noise pollution stemming from the operational of the project	sensitive receptors (night-
		Surrounding noise quality	Construction & Operational	Control		time).
20.Drilling &		quanty	Operational			(3) Define the noisy areas
Blasting						with a set boundary ensuring
						that equivalent A-weighted
21. RoM &						noise levels at this boundary
product						does not exceed 61 dB
stockpiling						LAleq,24hr. It should be
23. Screening						noted that the area would
Operations						have to be demarcated as a
- Paramana						"controlled zone" in terms of



						the NCR;
24. Discard						(4) Ensure that the change
disposal						in ambient sound levels as
(backfilling of						experienced by Potentially
mining area)						Sensitive Receptors is less
30. Vehicular						than 5 - 7 dBA;
activity on haul						(5) Ensuring compliance with
roads; and						the National Noise Control
operation of						Regulations and
mining						SANS10103:2008
equipment						guidelines. The referencing
equipment						of the International Finance
33.						Corporation (World Bank)
Rehabilitation of						guidelines for an acceptable
mining areas						sound level in a residential
						area was also considered.
40 Tanasil and	Destauration of					(1) All sites clearly
18.Topsoil and	Destruction of					demarcated as no-go areas.
subsoil stripping	graves				Identification of all possible sites of	(2) Evidence of records
& stockpiling for		Loss of heritage	Construction &	Avoid	archaeological value and graves has been	should further discoveries be
mining operation		resources	Operational	Avoiu	identified prior to the commencement of	identified during
area					authorised work.	construction.
						(3) Full compliance to all
						mitigation measures.



18.Topsoil and subsoil stripping & stockpiling for mining operation area	Degradation of cultural significance heritage sites	Loss of heritage resources	Construction & Operational	Avoid	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 should further discoveries be identified during construction. (3) Full compliance to all mitigation measures.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast	Erosion	Loss of fertile soil	Construction & Operational	Control	To prevent any erosion and to provide adequate erosion control measures where required.	(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



mining excavations 21. RoM &	implemented in high risk areas. (4) No signs of prolonged
	(4) No signs of prolonged
21. RoM &	
21. ROM &	
	exposure of un-vegetated
product	areas by lack of
stockpiling	implementing rehabilitation
24. Discard	measures.
disposal	
(backfilling of	
mining area)	
Initing area)	
27. River	
Migra occepyctoms	
crossings Wildo-ecosystems	
30. Vehicular	
activity on haul	
roads; and	
operation of	
mining	
equipment	
32. Water	
Management	
33.	



Rehabilitation of						
mining areas						
						(1) All vehicles, plant, and
18.Topsoil and	CO₂ emissions					equipment to be serviced as
subsoil stripping						per manufacturer's
& stockpiling for					The levels of greenhouse gas and CO2	maintenance schedules.
mining operation			Construction &		emissions emanating from the use of plant and	(2) Record keeping of
area		Air Quality	Operational	Control	vehicles as well as the use of generators for	service records of all
19.Opencast					power on site, is kept to a minimum.	vehicles, plant, and
mining						equipment.
excavations						(3) No evidence of plant,
						equipment or vehicles in bad



04.5.44.0			condition.
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			
Fublic Idaus			



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	Wetland and Aquatic Ecology Surface Water quality	Construction & Operational	Remedy	Remedy the possible effects of alteration to natural drainage lines. Adherence with water quality requirements as set by the Water Use Licence Conditions.	(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 areas. (4) No signs of degradation of diversion channels or drainage systems.
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 Downstream water users	Construction & Operational	Remedy	Remedy the possible effects of destruction of upstream tributaries and reduction in the water catchment. Adherence with water quality requirements set by the Water Use Licence Conditions.	(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%.



19.Opencast mining excavations 32. Water Management		Surface Water quality				(3) Erosion control measures implemented in high risk areas.(4) No signs of degradation of diversion channels or drainage systems.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling 33. Rehabilitation of mining areas	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Construction & Operational	Control	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.



19.Opencast mining excavations 20.Drilling &	Contamination of water resources	Wetlands and Aquatic Ecology				(1) Water quality of streams
Blasting						and rivers are maintained within the predetermined
21. RoM & product stockpiling		Surface Water			Avoid the release of pollutants into the aquatic	seasonally baseline levels. (2) No evidence of pollutants
22. Residue		quality			environment. Waste water is appropriately managed.	released into streams and rivers. (3) No formation of erosion
stockpiles 23. Screening			Construction & Operational	Avoid	Erosion is prevented. Suitable water	gullies or rills. (4) No leaks or spills caused
Operations					management facilities and treatment works are developed and maintained.	by inadequate waste water management facilities.
24. Discard disposal						(5) Reporting of all section 30 of NEMA and section 20
(backfilling of mining area)		Groundwater quality				of the National Water Act incidents.
25. Waste generation,						
storage and disposal						



26. Chemical Toilets 27. River crossings 28. Water supply (potable & process)						
29. Storage of fuel and lubricants in temporary facilities 32. Water Management						
20.Drilling & Blasting	Damage to surrounding landowner properties	Socio-economic Human health and safety environment	Operational	Avoid	Avoid damage to any surrounding landowner properties, infrastructures 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.



22. Residue stockpiles	Hazardous Leachate	Groundwater quality				(1) Exceedance in water quality are limited to 5% of the baseline thresholds.
25. Waste generation, storage and disposal		Aquatic ecology	Operational	Control	Ensure that hazardous leachates are not released into the natural environment.	(2) No contamination of water resources. (3) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.
25. Waste generation, storage and disposal	Illegal dumping	Surface water contamination Human health and safety environment Soil 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.(2) No unpleasant odours.(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) PCD's containing putrescrible waste to be monitored and kept free of odour. (3) All putrescrible waste removed and disposed off in a suitable manner.



28. Water supply (potable & process)	Improper water storage management	Wastage of water resource				(1) Abstraction from natural watercourses is kept to a minimum and does not
32. Water Management	management	Water contamination	Construction & Operational	Avoid	Avoid wastage of water resources. Maintain all infrastructures associated to the management of domestic water.	exceed the DWAS Water Use Licence provisions by more than 5% on an annual basis (2) No visible signs of leaks or damage to water storage infrastructures. (3) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents.
29. Storage of fuel and lubricants in temporary facilities	Chemical Fires	Human health and safety environment Loss of ecosystems Damage to property	Construction & Operational	Avoid	Avoid and prevent chemical fires. Hazardous spills are prevented and no incidents to human health occur.	 (1) Water quality of streams and rivers are maintained within the predetermined seasonally baseline levels. (2) Immediate removal and remediation of all spills (3) All staff trained. (4) All hazardous substances are documented.



31. Bulk transporting of Ore to market on Public roads	Pressure on public transport infrastructure	Socio-economic	Construction & Operational	Control	Accidents are kept to a minimum. The surface quality of the road is not negatively impacted resulting from haulage of ROM product. The presence of heavy vehicles turning are clearly indicated thereby minimising potential accidents. Sections of existing road surfaces which have been impacted on by the haulage of ROM product are remediated.	 (5) No incidents recorded involving chemical fires. (6) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents. (1) No incidents reported of vehicle, pedestrian, and livestock accidents. (2) Condition of road surface maintained (3) No complaints from surrounding landowners or road users. (4) Clearly visibility of warning signage. (5) Existing road surfaces are utilised and maintained within baseline levels.
				Decommissioning		
35. Demolition / removal of portable and	Hydrocarbon Contamination	Surface Water quality	Decommissioning	Control	Adequate protection of soil and water resources. Active remediation in case of spill is ensured.	(1) No evidence of hydrocarbon and hazardous spills. (2) No release of



related						contaminated water into the
infrastructure		0				natural environment.
		Groundwater quality				(3) Immediate removal and
36. Vehicular						remediation of all spills.
activity: removal						(4) Reporting of all section
of mobile plant /						30 of NEMA and section 20
equipment and						of the National Water Act
vehicles						incidents.
38. Demolition of						(5) Implement rehabilitation
PCD's						measures as per the Mine
1000		Soil quality				Rehabilitation,
39. Demolition of		Soil quality				decommissioning and mine
workshops,						closure liability Plan in
waste storage						compliance with GN R. 1147
facilities, fuel						of NEMA.
storage facilities						
etc.						
25 Damalitias /	Duet					(1) Dust fallout levels at
35. Demolition /	Dust					active operational sites do
removal of	generation	Air Quality	Decommissioning	Control	Control dust fallout throughout the life cycle of	not exceed the pre-
portable and		7 222	Decommissioning		the mining activity.	determined baseline levels
related						by more than 10%.



infrastructure		(2) Zero number of
		complaints from site staff,
36. Vehicular	Human Health	surrounding landowners and
activity: removal		communities.
of mobile plant /		(3) Adherence with legal
equipment and		required dust fallout levels.
vehicles		(4) Adherence with 600
27		mg/m² /day averaged over
37.		30 days in residential areas
Rehabilitation of		and 1200 mg/m² /day
the lay down		averaged over 30 days in
areas		non-residential areas.
38. Demolition of		(5) No more than two within
PCD's	Topography and Visual	a year, no two sequential
	Environment	months per dust fallout
39. Demolition of		monitoring site.
workshops,		(6) If exceeding dust fallout
waste storage		standard, within 3 months
facilities, fuel		after submission of a dust
storage facilities		fallout monitoring report,
etc.		develop and submit a dust
		management plan to the air
		quality officer for approval.



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35. Demolition / removal of portable and related infrastructure	Degradation of soil resources	Soil quality				(1) No evidence of erosion.(2) No mixing of topsoil or fertile soils with infertile soils.(3) No signs of prolonged
37. Rehabilitation of the lay down areas 38. Demolition of PCD's		Flora micro- ecosystems	Decommissioning	Remedy	Adequate protection of soil resources and remediation if degradation cannot be avoided.	exposure of un-vegetated areas by lack of implementing rehabilitation measures. (4) Implement rehabilitation measures as per the Mine Rehabilitation,
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.		Cooystonis				decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.



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35. Demolition / removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and	Erosion	Loss of fertile soil	Decommissioning	Control	To prevent any erosion and to provide adequate erosion control measures where required.	(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 areas.
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vehicles 37. Rehabilitation of the lay down areas 38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities, fuel		Micro-ecosystems				(4) No signs of prolonged exposure of un-vegetated areas by lack of implementing rehabilitation measures. (5) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA.
etc. 35. Demolition / removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant /	Noise generation	Surrounding noise quality	Decommissioning	Control	Control potential noise pollution stemming from the decommissioning phase of the project	(1) Ensure equivalent A-weighted noise levels below 55 dBA at potentially noise-sensitive receptors (daytime). (2) Ensure equivalent A-weighted noise levels below 45 dBA at potentially noise-sensitive receptors (night-



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equipment and		time).
vehicles		(3) Define the noisy areas
		with a set boundary ensuring
38. Demolition of		that equivalent A-weighted
PCD's		noise levels at this boundary
39. Demolition of		does not exceed 61 dB
workshops,		LAleq,24hr. It should be
waste storage		noted that the area would
facilities, fuel		have to be demarcated as a
storage facilities		"controlled zone" in terms of
etc.		the NCR;
		(4) Ensure that the change
		in ambient sound levels as
		experienced by Potentially
		Sensitive Receptors is less
		than 5 - 7 dBA;
		(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.
35. Demolition / removal of portable and related infrastructure 38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities etc.	General waste generation & Littering	Topography and Visual Environment Soils quality due to leachates Surface Water quality due to leachates	Decommissioning	Control	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.(2) No unpleasant odours.(3) Marked and sealable bins observed.(4) Evidence of waste disposal certificates
36. Vehicular activity: removal of mobile plant / equipment and vehicles	CO ₂ emissions	Air Quality	Decommissioning	Control	The levels of greenhouse gas and CO2 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.	 (1) All vehicles, plant, and equipment to be serviced as per manufacturer's maintenance schedules. (2) Record keeping of service records of all vehicles, plant, and equipment.



						(3) No evidence of plant, equipment or vehicles in bad condition.
36. Vehicular activity: removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas	Sedimentation and siltation of watercourses	Wetland and Aquatic Ecology Surface Water quality	Decommissioning	Control	Avoid or minimise the degradation of water quality of watercourses due to sedimentation and siltation.	(1) Ensure water quality results do not exceed the pre-determined baseline results with more than 10%. (2)Water quality of streams and rivers are maintained within the pre-determined seasonality baseline levels. (3) No incidents related to the pollution of rivers and streams. (4) No visible signs of erosion damages.
37. Rehabilitation of the lay down areas	Influx of alien invasive vegetation	Fauna and Flora micro and macro ecosystems	Decommissioning	Control	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.



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37. Rehabilitation of the lay down areas	Vegetation and habitat loss	Macro and Micro organisms Fauna and Flora	Decommissioning	Remedy	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 Rehabilitation, decommissioning and mine closure liability Plan in compliance with GN R. 1147 of NEMA. (5) No unauthorised activities outside of the proposed footprint. (6) Avoid activities in No-Go areas as identified in Appendix G.
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38. Demolition of PCD's	Contamination of water	Wetlands and Aquatic Ecology Surface Water				(1) Water quality of streams and rivers are maintained
39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	resources	Groundwater quality	Decommissioning	Avoid	Avoid the release of pollutants into the aquatic environment. Waste water is appropriately managed. Erosion is prevented. Suitable water management facilities and treatment works are developed and maintained.	within the predetermined seasonally baseline levels. (2) No evidence of pollutants released into streams and rivers. (3) No formation of erosion gullies or rills. (4) No leaks or spills caused by inadequate waste water management facilities. (5) Reporting of all section 30 of NEMA and section 20 of the National Water Act incidents. (6) Implement rehabilitation measures as per the Mine Rehabilitation, decommissioning and mine



			closure liability	Plan in
			compliance with 0	GN R. 1147
			of NEMA.	

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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 17.

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.

Development of an Environmental Policy

The management team of the Spitsvale Project 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 Project 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 Project; and
- Is available to the public.

Legal and other requirements

The management team of the SPitsvale Project 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 Project 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.

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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 EMPr; 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 project 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 project 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 EMPr, 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.

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Communication

With regard to its environmental aspects and the EMS, the management team of the Spitsvale project shall establish, implement, and maintain a procedure(s) for:

- Internal communication among various levels and functions; and
- Receiving, documenting, and responding to relevant communication 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) be audited throughout the time these documentation remains valid.

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 Project EMS documentation shall include the following:

- The Spitsvale Project environmental policy and the objectives and targets specified in the EMPr (Table 17);
- 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



DMR REF: LP 30/5/1/2/3/2/1 (10104)

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 Project 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 Project'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 Project shall establish, implement and maintain a procedure for periodically evaluating compliance with all requirements set out in the developed Spitsvale EMS, the approved EMPr, 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.

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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 Project.

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 EMPr, 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 EMPr, 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;
- Communication from external I&AP, including complaints;
- The environmental performance of the Spitsvale Project;
- 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 developments 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, EMRr, EA, and closure plan, consistent with the commitment to continual improvement.

Table 18: Recommended management actions to be implemented to ensure objectives and targets are reached

whether listed or not listed.	POTENTIAL IMPACT	MITIGATION	TIME PERIOD FOR	COMPLIANCE WITH STANDARDS
	(e.g. dust, noise, drainage surface	TYPE	IMPLEMENTATION	(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 managemen
	disturbance, fly rock, surface water	(modify, remedy, control, or stop)	Describe the time period when the	standards or practices that have been identified by Competent Authorities)
discard dumps or dams, Loading,	contamination, groundwater	through	measures in the environmental	
• • • • •	contamination, air pollution etcetc)	(e.g. noise control measures, storm-	management programme must be	
dams and boreholes, accommodation,		water control, dust control,	implemented Measures must be	
offices, ablution, stores, workshops,		rehabilitation, design measures,	implemented when required.	
processing plant, storm water control,		blasting controls, avoidance, relocation,	With regard to Rehabilitation specifically	
berms, roads, pipelines, power lines,		alternative activity etc. etc)	this must take place at the earliest	
conveyors, etcetcetc.).		E.g.	opportunityWith regard to Rehabilitation,	
		Modify through alternative method.	therefore state either:	
		Control through noise control	Upon cessation of the individual activity	
		Control through management and	or.	
		monitoring	Upon the cessation of mining, bulk	
			sampling or alluvial diamond prospecting	
		Remedy through rehabilitation	as the case may be.	
			Construction Phas	e
1. Access and hauling along	Dust generation			
	bust generation			
roads i.e. during the	· ·			
construction of roads	· ·			
	· ·			(1) Development and implementation of a Dust management plan as part of an Air quality management plan to including the
2. Site clearing and topsoil	· ·		(4) Magazina must be	monitoring and prevention programme.
stripping for lay down area and	· ·		(1) Measures must be	(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by
all related mining infrastructure	· ·		implemented when required	Act no 20 of 2014.
an related mining minastructure	· ·	2	during the activities listed	
5. Mining offices (construction	· ·	Control	(2) Ongoing monitoring of	(3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQ
,	· · · · · · · · · · · · · · · · · · ·		compliance throughout the entire	(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reportir
and operation) i.e. operation of	· ·			Regulations (GNR 283) as Group C emitters.
training centres, offices and	· ·		life cycle of the project	(5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 200
kitchen facilities	· ·			
				(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)
8. Pollution Control Dams	'			
8. Pollution Control Dams	·			
(PCD's) i.e. Construction and	1			
(PCD's) i.e. Construction and operation	Hydrocarbon Contamination		(1) Mitigation measures must be	(1) Development of water management plan addressing monitoring and management requirements
(PCD's) i.e. Construction and operation 1. Access and hauling along	Hydrocarbon Contamination		(1) Mitigation measures must be	(1) Development of water management plan addressing monitoring and management requirements.
(PCD's) i.e. Construction and operation 1. Access and hauling along roads i.e. during the	Hydrocarbon Contamination		implemented for the complete	(2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas".
(PCD's) i.e. Construction and operation	Hydrocarbon Contamination	Control		
(PCD's) i.e. Construction and operation 1. Access and hauling along roads i.e. during the construction of roads	Hydrocarbon Contamination	Control	implemented for the complete	(2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas". (3) Development of emergency response plan with specific reference to spill prevention and remediation.
(PCD's) i.e. Construction and operation 1. Access and hauling along roads i.e. during the	Hydrocarbon Contamination	Control	implemented for the complete duration of the activities listed (2) Ongoing monitoring of	 (2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas". (3) Development of emergency response plan with specific reference to spill prevention and remediation. (4) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of the separation of "dirty" and clean "areas".
(PCD's) i.e. Construction and operation 1. Access and hauling along roads i.e. during the construction of roads	Hydrocarbon Contamination	Control	implemented for the complete duration of the activities listed (2) Ongoing monitoring of compliance throughout the entire	 (2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas". (3) Development of emergency response plan with specific reference to spill prevention and remediation. (4) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages.
(PCD's) i.e. Construction and operation 1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil	Hydrocarbon Contamination	Control	implemented for the complete duration of the activities listed (2) Ongoing monitoring of	 (2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas". (3) Development of emergency response plan with specific reference to spill prevention and remediation. (4) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of the separation of "dirty" and clean "areas".



			in the event of an incident	
3. Weigh bridge			and the state of t	
6. Storm water runoff				
management features				
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				
16. Use of existing drilled / new				
boreholes				
1. Access and hauling along	Degradation of soil resources			
roads i.e. during the				
construction of roads				
2. Site clearing and topsoil				
stripping for lay down area and			(1) Mitigation measures must be	
all related mining infrastructure			implemented for the complete	
9.Stores, workshops &wash			duration of the activities listed	(1) Development of a soil conservation management plan.
bays		Remedy	(2) Ongoing monitoring of compliance throughout the entire	(2) Development of a storm water management plan.(3) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of
10. Ablutions & change house			life cycle of the project	plant/vehicles/equipment for leaks or breakages.
with sewage treatment plant			(3) Immediate remediation actions	
11. Fuel operating power			in the event of an incident	
generators				
13. Fuel storage				
				(1) Development and implementation of a sterm water management plan
1. Access and hauling along	Erosion	Control	(1) Mitigation measures must be	(1) Development and implementation of a storm water management plan.(2) Development of a soil conservation management plan.
			() - :0: : : :::::::::::::::::::::::::::	(2) Development of a soft conservation management plan.



roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 6. Storm water runoff management features 15. Transport of construction material, mobile plant and equipment to the site			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	(3) Development and implementation of mine rehabilitation plan.
1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 6. Storm water runoff management features	Vegetation and habitat loss	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	 (1) Develop a plant species search and rescue management plan. (2) Develop and implement a phased rehabilitation management plan. (3) Develop and implement a soil conservation management plan. (4) Apply for permits to remove protected species (provincial and national).
1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 6. Storm water runoff management features 15. Transport of construction	Sedimentation and siltation of watercourses	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 (3) Immediate remediation actions in the event of an incident (4) Immediate re-vegetation on completion of listed activity (5) Reporting of incidents within 48h to the competent authority	(1) Develop a storm water management plan. (2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.



material, mobile plant and				
1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities 9.Stores, workshops &wash bays 11. Fuel operating power generators	Noise generation	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 (3) Immediate remediation actions in the event of an incident	(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. (2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.
1. Access and hauling along roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 6. Storm water runoff management features	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.
Access and hauling along roads i.e. during the	Destruction of upstream tributaries and reduction in	Remedy	(1) Mitigation measures must be implemented for the complete	(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.

construction of roads	water in the catchment		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. Access and hauling along	Water usage for dust		(1) Mitigation measures must be	
roads i.e. during the	suppression		implemented for the complete	
construction of roads	Suppression		duration of the activities listed	
construction of roads			(2) Ongoing monitoring of	
			compliance throughout the entire	(4) Development and involve exterior of a Double constant of the constant of t
		Control	life cycle of the project	(1) Development and implementation of a Dust management plan including the monitoring and prevention programme.
			inc cycle of the project	(2) Develop and implement a water usage record keeping procedure.
1. Access and hauling along	Influx of alien invasive			
roads i.e. during the	vegetation			
construction of roads			(1) Mitigation measures must be	
2. Site clearing and topsoil			implemented for the complete	
stripping for lay down area and			duration of the activities listed	
all related mining infrastructure		Control	(2) Ongoing monitoring of	(1) Develop and implement an alien eradication and control management plan.
a rotatoa ililililig lililasti aotale		John Or	compliance throughout the entire	(1) 2010-09 and imploment an alien ordination and control management plan.
5. Mining offices (construction			life cycle of the project	
and operation) i.e. operation of			(3) Immediate removal of all alien	
training centres, offices and			invasive species	
kitchen facilities				
Access and hauling along	CO₂ emissions & Release of	Control	(1) Mitigation measures must be	(1) Develop and maintain a Carbon footprint reporting policy.
	Joz dimodiono a release of		(1) Miligation modules must be	



roads i.e. during the construction of roads 2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 9.Stores, workshops &wash bays 11. Fuel operating power generators	noxious gasses		implemented for the complete duration of the activities listed (2) Ongoing monitoring of compliance throughout the entire life cycle of the project	
15. Transport of construction material, mobile plant and equipment to the site				
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	Topography and visual alteration	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) Mine plan in accordance with the MPRDA Regulation 56 section (1) to (8). (2) Adherence to the finalised approved lay out plan. (3) Development and implementation of the phased mine rehabilitation management plan.
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure 16. Use of existing drilled / new boreholes	Water level reduction and contamination	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 (3) Immediate remediation actions	 (1) Develop and implement a water management plan and specifically include measures to be implemented to reduce the impact on surface and groundwater reduction. (2) Ensure compliance with the issued WUL requirements. (3) Develop and implement a storm waste management plan and specifically address the diversion of "clean" water into the natural drainage lines.

			in the event of an incident (4) Immediate rehabilitation measures to be implemented on the completion of listed activity. (5) Reporting of incidents within 48h to the competent authority	
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure	Destruction of graves	Avoid	(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.
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure	Degradation of cultural significance heritage sites	Avoid	(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.
4. Onsite Clinic	Medical Waste generation	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 (3) Immediate remediation actions in the event of an incident	 (1) Development of a Health and Safety management plan specifically addressing the management of medical waste. (2) Development of a management plan for the operation of the on-site Clinic. (3) Development and implementation of a detailed Waste management plan.
4. Onsite Clinic 5. Mining offices (construction	Electricity usage	Control	(1) Mitigation measures must be implemented for the complete duration of the activities listed	(1) Develop and implement an electricity usage monitoring programme. (2) Develop and implement a carbon footprint reporting policy.



and operation) i.e. operation of			(2) Ongoing monitoring of	
training centres, offices and			compliance throughout the entire	
kitchen facilities			life cycle of the project	
12. Lighting				
4. Onsite Clinic 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	Domestic water usage	Avoid	(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 implement a water usage record keeping procedure.(2) Develop and implement an infrastructure maintenance programme to include frequent inspections of water pipes and taps.
5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	General waste generation & Littering	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 (3) Immediate remediation actions in the event of an incident	(1) Develop and implement a Waste Management plan. (2) Recording of all waste generated by authorised activities.
7. Water storage facilities	Improper water storage management	Avoid	(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 water management plan specifically addressing the storage of water as well as the frequent inspections of storage facilities.
8. Pollution Control Dams (PCD's) i.e. Construction and operation 9.Stores, workshops &wash	Contamination of water resources	Avoid	(1) Mitigation measures must be implemented for the complete duration of the activities listed (2) Ongoing monitoring of compliance throughout the entire	 (1) Develop and implement an Integrated Waste Water Management Plan (IWWMP). (2) Develop and implement a water monitoring schedule according to the water management plan. (2) Ensure compliance with the WUL conditions. (3) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.



bays 10. Ablutions & change house with sewage treatment plant 11. Fuel operating power generators 13. Fuel storage			life cycle of the project (3) Immediate remediation actions in the event of an incident (4) Reporting of incidents within 48h to the competent authority	
8. Pollution Control Dams (PCD's) i.e. Construction and operation 10. Ablutions & change house with sewage treatment plant	Smell nuisance	Avoid	(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) Reporting of incidents within 48h to the competent authority	 (1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets. (2) Develop and implement an Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste. (3) Develop and implement a Waste Management plan.
9.Stores, workshops &wash bays 11. Fuel operating power generators 13. Fuel storage	Chemical Fires	Avoid	(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) Reporting of incidents within 48h to the competent authority	 (1) Develop and implement a fire prevention plan that includes measures of prevention and response to chemical fires. (2) Develop an emergency preparedness procedure and include the process to be followed in case of a chemical fire. (3) Develop a Hazardous substances management plan. (4) Develop a frequent inspection programme to include inspections of hazardous substances storage facilities.
12. Lighting	Light pollution	Control	(1) Biennial investigation and reporting	(1) Biennial investigation of the impact of Light pollution to nocturnal species.
13. Fuel storage	Emission of noxious fumes	Avoid	(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 implement a Hazardous substance management plan addressing adherence 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.

			(3) Immediate remediation actions	
			in the event of an incident	
14. Employment of workers and	Loss of farm labour	Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA.
procurement of construction			-	(2) Develop and implement a grievance lodging procedure.
materials.	Population Influx – Pressure on	Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Resources	Control		(2) Develop and implement a grievance lodging procedure.
	Population Influx – Social	Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Pathologies	Control	(1) Mitigation measures must be	(2) Develop and implement a grievance lodging procedure.
	Population Influx – Community	Control	implemented for the complete duration of the activities listed	(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Conflict	Control	(2) Ongoing monitoring of	(2) Develop and implement a grievance lodging procedure.
	Health and Safety of employees	Control	compliance throughout the entire life cycle of the project	(1) Develop and implement a Health and Safety Management plan.
		Ontrol Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Job Creation and Skills Training			(2) Develop and implement a grievance lodging procedure.
	Job Creation (Multiplier affect) and Population Influx	Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
Operational Phase				
47.5		Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA.
17. Employment of workers	Loss of farm labour	Control		(2) Develop and implement a grievance lodging procedure.
	Population Influx – Pressure on	0		(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Resources	Control	(1) Mitigation measures must be	(2) Develop and implement a grievance lodging procedure.
	Population Influx – Social	Control	implemented for the complete	(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Pathologies	Control	duration of the activities listed (2) Ongoing monitoring of	(2) Develop and implement a grievance lodging procedure.
	Population Influx – Community	Cantral	compliance throughout the entire	(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Conflict	Control	life cycle of the project	(2) Develop and implement a grievance lodging procedure.
	Health and Safety of employees	Control		(1) Develop and implement a Health and Safety Management plan.
	11.0	Control	1	(1) Develop and implement a Social Labour plan as defined by the MRPDA.
	Job Creation and Skills Training	Control		(2) Develop and implement a grievance lodging procedure.



	Job Creation (Multiplier affect) and Population Influx	Control		(1) Develop and implement a Social Labour plan as defined by the MRPDA. (2) Develop and implement a grievance lodging procedure.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 20.Drilling & Blasting 21. RoM & product stockpiling 22. Residue stockpiles 23. Screening Operations 24. Discard disposal (backfilling of mining area) 30. Vehicular activity on haul roads; and operation of mining equipment 31. Bulk transporting of Ore to market on Public roads	Dust generation	Control	(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) Development and implementation of 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) (6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling 22. Residue stockpiles	Alteration of the visual environment and topography	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 re-habilitation	 (1) Mine plan in accordance with the MPRDA Regulation 56 section (1) to (8). (2) Adherence to the finalised approved lay out plan. (3) Development and implementation of the phased mine rehabilitation management plan.

			measures to be implemented on	
			the completion of listed activity.	
			the completion of listed activity.	
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Degradation of soil resources			
19.Opencast mining excavations				
20.Drilling & Blasting				
21. RoM & product stockpiling			(1) Mitigation measures must be	
22. Residue stockpiles			implemented for the complete duration of the activities listed	(1) Development of a soil conservation management plan.
23. Screening Operations		Remedy	(2) Ongoing monitoring of compliance throughout the entire	(2) Development of a storm water management plan.
24. Discard disposal (backfilling				(3) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of
of mining area)			life cycle of the project	plant/vehicles/equipment for leaks or breakages.
25. Waste generation, storage and disposal			(3) Immediate remediation actions in the event of an incident	
26. Chemical Toilets				
29. Storage of fuel and lubricants in temporary facilities				
33. Rehabilitation of mining areas				
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Vegetation and habitat loss	Remedy	(1) Mitigation measures must be implemented for the complete duration of the activities listed (2) Ongoing monitoring of	(1) Develop a plant species search and rescue management plan.(2) Develop and implement a phased rehabilitation management plan.
19.Opencast mining excavations		Remody	compliance throughout the entire life cycle of the project	(3) Develop and implement a soil conservation management plan. (4) Apply for permits to remove protected species (provincial and national).
21. RoM & product stockpiling			(3) Immediate remediation actions in the event of an incident	



			(4) Immediate re vegetation es	
22. Residue stockpiles			(4) Immediate re-vegetation on completion of listed activity	
33. Rehabilitation of mining areas				
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of Wetlands	Avoid	(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 water management plan and specifically include the conservation measures to be implemented in wetland areas.(2) Ensure compliance with the issued WUL requirements.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 20.Drilling & Blasting 21. RoM & product stockpiling 23. Screening Operations 24. Discard disposal (backfilling of mining area)	Hydrocarbon Contamination	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 (3) Immediate remediation actions in the event of an incident	 (1) Development of water management plan addressing monitoring and management requirements. (2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas". (3) Development of emergency response plan with specific reference to spill prevention and remediation. (4) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of plant/vehicles/equipment for leaks or breakages. (5) Development and implementation of a Hazardous substances management plan.

	1			
27. River crossings 29. Storage of fuel and lubricants in temporary facilities 30. Vehicular activity on haul roads; and operation of mining equipment				
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling 22. Residue stockpiles 23. Screening Operations 24. Discard disposal (backfilling of mining area) 27. River crossings 30. Vehicular activity on haul roads; and operation of mining equipment 32. Water Management	Sedimentation and siltation of watercourses	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 (3) Immediate remediation actions in the event of an incident (4) Immediate re-vegetation on completion of listed activity (5) Reporting of incidents within 48h to the competent authority	(1) Develop a storm water management plan. (2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.
33. Rehabilitation of mining areas 18.Topsoil and subsoil stripping & stockpiling for mining	Water level reduction and contamination	Control	(1) Mitigation measures must be implemented for the complete	(1) Develop and implement a water management plan and specifically include measures to be implemented to reduce the impact on surface and groundwater reduction.(2) Ensure compliance with the issued WUL requirements.



operation area 27. River crossings 28. Water supply (potable & process) 32. Water Management			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 rehabilitation measures to be implemented on the completion of listed activity. (5) Reporting of incidents within 48h to the competent authority	(3) Develop and implement a storm water management plan and specifically address the diversion of "clean" water into the natural drainage lines.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 20.Drilling & Blasting 21. RoM & product stockpiling 23. Screening Operations 24. Discard disposal (backfilling of mining area) 30. Vehicular activity on haul roads; and operation of mining equipment 33. Rehabilitation of mining areas	Noise generation	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 (3) Immediate remediation actions in the event of an incident	(1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. (2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of graves	Avoid	(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) 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.

			(3) Immediate reporting of incidents to the NHRA		
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Degradation of cultural significance heritage sites	Avoid	(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 areas	Erosion	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 (3) Immediate remediation actions in the event of an incident	(1) Development and implementation of a storm water management plan. (2) Development of a soil conservation management plan. (3) Development and implementation of mine rehabilitation plan.	
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations	CO₂ 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.	



			Ι	
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				
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.
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 32. Water Management	Destruction of upstream tributaries and reduction in water in the catchment	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	(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.

	T	T		
			measures to be implemented on	
			the completion of listed activity.	
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining excavations 21. RoM & product stockpiling 33. Rehabilitation of mining areas	Influx of alien invasive vegetation	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 (3) Immediate removal of all alien invasive species	(1) Develop and implement an alien eradication and control management plan.
19.Opencast mining excavations 20.Drilling & Blasting 21. RoM & product stockpiling 22. Residue stockpiles 23. Screening Operations 24. Discard disposal (backfilling of mining area) 25. Waste generation, storage and disposal 26. Chemical Toilets 27. River crossings 28. Water supply (potable & process) 29. Storage of fuel and	Contamination of water resources	Avoid	(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) Reporting of incidents within 48h to the competent authority	(1) Develop and implement an Integrated Waste Water Management Plan (IWWMP). (2) Develop and implement a water monitoring schedule according to the water management plan. (2) Ensure compliance with the WUL conditions. (3) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water contamination.
29. Storage of fuel and lubricants in temporary				
iubiicante in temporary				

facilities					
32. Water Management					
20.Drilling & Blasting	Damage to surrounding landowner properties	Avoid	(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) Health and safety act, act 29 of 1996. (2) Explosives Act, act 15 of 2003.	
22. Residue stockpiles 25. Waste generation, storage and disposal	Hazardous Leachate	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 (3) Immediate remediation actions in the event of an incident (4) Reporting of incidents within 48h to the competent authority	(1) Develop and implement a Waste Management plan. (2) Develop and implement an Integrated Waste Water Management plan.	
25. Waste generation, storage and disposal	Illegal dumping	Avoid	(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) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.	
26. Chemical Toilets	Smell nuisance	Avoid	(1) Mitigation measures must be implemented for the complete duration of the activities listed (2) Ongoing monitoring of	 (1) Develop and implement an Integrated Waste Water Management plan specifically addressing the management of sewage or chemical toilets. (2) Develop and implement a Infrastructure inspection programme to ensure no leaks or spillages of sewerage or waste. (3) Develop and implement a Waste Management plan. 	

			compliance throughout the entire		
			life cycle of the project		
			(3) Immediate remediation actions		
			in the event of an incident		
			in the event of an incident		
28. Water supply (potable &	Improper water storage		(1) Mitigation measures must be		
process)	management		implemented for the complete		
00.111.6.11			duration of the activities listed		
32. Water Management		Accelot	(2) Ongoing monitoring of	(1) Develop and implement a water management plan specifically addressing the storage of water as well as the frequent	
		Avoid	compliance throughout the entire	inspections of storage facilities.	
			life cycle of the project		
			(3) Immediate remediation actions		
			in the event of an incident		
29. Storage of fuel and lubricants in temporary	Chemical Fires		(1) Mitigation measures must be implemented for the complete		
facilities		Avoid	duration of the activities listed		
			(2) Ongoing monitoring of	(1) Develop and implement a fire prevention plan that includes measures of prevention and response to chemical fires.	
			compliance throughout the entire	(2) Develop a emergency preparedness procedure and include the process to be followed in case of a chemical fire.	
			life cycle of the project	(3) Develop a Hazardous substances management plan.	
			(3) Immediate remediation actions	(4) Develop a frequent inspection programme to include inspections of hazardous substances storage facilities.	
			in the event of an incident		
		(4) Reporting of incidents within			
			48h to the competent authority		
31. Bulk transporting of Ore to	Pressure on public transport		(1) Mitigation measures must be		
market on Public roads	infrastructure		implemented for the complete		
		Control	duration of the activities listed	(1) Develop and implement a traffic management plan.	
		Control	(2) Ongoing monitoring of	(2) Develop and implement a Public Complaints procedure.	
			compliance throughout the entire		
Decommissioning Phase			life cycle of the project		
Decommissioning Phase				(1) Development of water management plan addressing monitoring and management requirements	
35. Demolition / removal of	Hydrocarbon Contamination		(1) Mitigation measures must be	(1) Development of water management plan addressing monitoring and management requirements.	
portable and related			implemented for the complete	(2) Development of a storm water management plan addressing the separation of "dirty" and clean "areas".	
infrastructure		Control	duration of the activities listed	(3) Development of emergency response plan with specific reference to spill prevention and remediation.	
				(4) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of	
36. Vehicular activity: removal			(2) Ongoing monitoring of	plant/vehicles/equipment for leaks or breakages.	
			compliance throughout the entire	(5) Development and implementation of a Hazardous substances management plan.	



of mobile plant / equipment and vehicles			life cycle of the project (3) Immediate remediation actions	
venicles			in the event of an incident	
38. Demolition of PCD's			(4) Immediate re-vegetation on	
			completion of listed activity	
39. Demolition of workshops,			(5) Immediate rehabilitation	
waste storage facilities, fuel			measures to be implemented on	
storage facilities etc.			the completion of listed activity.	
35. Demolition / removal of portable and related infrastructure	Dust generation			(1) Development and implementation of a Dust management plan as part of a Air quality management plan to including the
36. Vehicular activity: removal				monitoring and prevention programme.
of mobile plant / equipment and			(1) Measures must be	(2) Ensuring compliance with the National Environmental Management: Air Quality Act (NEMAQA), No. 39 of 2004 as amended by
vehicles			implemented when required	Act no 20 of 2014.
155		Control	during the activities listed	(3) Ensure activities remain under the thresholds stipulated in GNR 893 (in terms of section 21 of NEMAQA.
37. Rehabilitation of the lay			(2) Ongoing monitoring of	(4) Register online to the National Atmospheric Emissions Inventory System (NAEIS) in terms of the National Reporting
down areas			compliance throughout the entire	Regulations (GNR 283) as Group C emitters.
38. Demolition of PCD's			life cycle of the project	(5) Ensuring compliance with the National Ambient Air Quality Standards (GNR 1210 of 24 December 2009).(6) Ensuring compliance with the National Dust Control regulations (GNR 897 of November 2013)
39. Demolition of workshops,				
waste storage facilities, fuel				
storage facilities etc.				
35. Demolition / removal of	Degradation of soil resources		(1) Mitigation measures must be	
portable and related	-		implemented for the complete	
infrastructure			duration of the activities listed	
			(2) Ongoing monitoring of	
37. Rehabilitation of the lay			compliance throughout the entire	(1) Development of a soil conservation management plan.
down areas		B I	life cycle of the project	(2) Development of a storm water management plan.
38. Demolition of PCD's		Remedy	(3) Immediate remediation actions	(3) Development and implementation of vehicle/plant/equipment maintenance plan with specific reference to daily inspections of
			in the event of an incident	plant/vehicles/equipment for leaks or breakages.
39. Demolition of workshops,			(4) Immediate re-vegetation on	
waste storage facilities, fuel			completion of listed activity	
storage facilities etc.			(5) Immediate rehabilitation	
			measures to be implemented on	
			the completion of listed activity.	



35. Demolition / removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas 38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Erosion	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 (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) Development and implementation of a storm water management plan.(2) Development of a soil conservation management plan.(3) Development and implementation of mine rehabilitation plan.
35. Demolition / removal of portable and related infrastructure 36. Vehicular activity: removal of mobile plant / equipment and vehicles 38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Noise generation	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 (3) Immediate remediation actions in the event of an incident	 (1) Develop and implement a noise monitoring programme to ensure compliance with the National Noise Control Regulations and SANS10103:2008 guidelines. (2) Develop and implement a vehicle/plant/equipment management plan to specifically include routine inspections and testing of sound frequencies.
35. Demolition / removal of portable and related infrastructure 38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	General waste generation & Littering	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 (3) Immediate remediation actions in the event of an incident	(1) Compliance with the National Environmental Management: Waste Act, act no 59 of 2008 and associated regulations.

36. Vehicular activity: removal of mobile plant / equipment and vehicles	CO₂ 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.	
36. Vehicular activity: removal of mobile plant / equipment and vehicles 37. Rehabilitation of the lay down areas	Sedimentation and siltation of watercourses	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 (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 a storm water management plan. (2) Develop and implement a water management plan and specifically include water monitoring and pollution prevention strategies.	
37. Rehabilitation of the lay down areas	Influx of alien invasive vegetation	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 (3) Immediate removal of all alien invasive species	(1) Develop and implement an alien eradication and control management plan.	
37. Rehabilitation of the lay down areas	Vegetation and habitat loss	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	 (1) Develop a plant species search and rescue management plan. (2) Develop and implement a phased rehabilitation management plan. (3) Develop and implement a soil conservation management plan. (4) Apply for permits to remove protected species (provincial and national). 	



38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Contamination of water resources	Avoid	in the event of an incident (4) Immediate re-vegetation on completion of listed activity (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	 (1) Develop and implement an Integrated Waste Water Management Plan (IWWMP). (2) Develop and implement a water monitoring schedule according to the water management plan. (3) Ensure compliance with the WUL conditions. (3) Develop an emergency preparedness plan addressing the prevention and management of incidents related to water
			in the event of an incident (4) Reporting of incidents within 48h to the competent authority	contamination.

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR THE SPITSVALE MINING PERMIT APPLICATION AND ASSOCIATED ACTIVITIES

DMR REF: LP 30/5/1/2/3/2/1 (10104)

i) Financial Provision

As part of the Spitsvale Mine Rehabilitation closure and Liability plan (attached as **Appendix S**), 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 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 90 452 381.83 (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 98% of the liability cost. The physical rehabilitation (demolition and removal of structures) amounts to 2% (**R 1 636 330.71**) of the liability cost. A focussed rehabilitation and closure strategy can minimise the liability of both components.

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 Project (including mining of phase 2 and 3 and the associated infrastructure) was calculated as R106 671 605.22 (including P&G, contingency and excluding VAT).

The increase in biophysical costs can be attributed to the addition of two opencast pits, with their associated infrastructure, in the future.

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 90% and the accuracy level of the calculation of the future mining development is 50%.

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DMR REF: LP 30/5/1/2/3/2/1 (10104)

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

(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 Project. 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 extent 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 S** 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 S**), 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 S**.

This document will be subjected to an additional 30 days PPP as required by GNR 982.

(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 S.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

Find Appendix S.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR THE SPITSVALE MINING RIGHT APPLICATION AND ASSOCIATED ACTIVITIES

DMR REF: LP 30/5/1/2/3/2/1 (10104)

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

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 S**.

Closure cost calculations

The premature quantum was calculated using the demolition and rehabilitation rates and has been calculated as R 90 452

381.83 (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 98% of the liability cost. The physical rehabilitation

(demolition and removal of structures) amounts to 2% (R 1 636 330.71) of the liability cost. A focussed rehabilitation and

closure strategy can minimise the liability of both components.

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 Project (including mining of

phase 2 and 3 and the associated infrastructure) was calculated as R106 671 605.22 (including P&G, contingency and

excluding VAT).

The increase in biophysical costs can be attributed to the addition of two opencast pits, with their associated infrastructure,

in the future.

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 90% and the accuracy

level of the calculation of the future mining development is 50%.

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Environmental Management Assistance (Pty) Ltd



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(f) Confirm that the financial provision will be provided as determined



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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 Project'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 19

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 should be as follows:

- Advise on any mitigation measures which need to be added to the existing programmes
- Communication 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 should 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.



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Table 19: Recommended mechanisms for monitoring compliance with and performance assessment against the EMPr

SOURCE ACTIVITY	IMPACTS	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND	MONITORING AND
	REQUIRING		RESPONSIBILITIE	REPORTING FREQUENCY and
	MONITORING		S	TIME PERIODS FOR
	PROGRAMMES		(FOR THE	IMPLEMENTING IMPACT
			EXECUTION OF	MANAGEMENT ACTIONS
			THE MONITORING	
			PROGRAMMES)	
1. Access and hauling along	Dust generation	The developed Air Quality management plan must include the following:	(1) Environmental	(1) Review of Air quality
roads i.e. during the		Methods of controlling dust generation	Control	management plan as or when
construction of roads		Identifying sensitive receptors and monitoring points	Officer/Environment	required
			al Officer/ SHEQ	(2) Monthly monitoring of
2. Site clearing and topsoil		It is recommended that baseline monitoring of dust fallout, PM10 and	Officer	compliance with the NEMAQA
stripping for lay down area and		PM2.5 is conducted at the site for a period of at least 12 months.	(2) Project	regulations
all related mining			Management	(3) Once of registration on the
infrastructure				online NAEIS systems thereafter
5. Mining offices (construction				reporting as specified
and operation) i.e. operation of				
training centres, offices and				
kitchen facilities				
8. Pollution Control Dams				
(PCD's) i.e. Construction and				



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operation			
18.Topsoil and subsoil			
stripping & stockpiling for			
mining operation area			
19.Opencast mining			
excavations			
20.Drilling & Blasting			
21. RoM & product stockpiling			
22. Residue stockpiles			
23. Screening Operations			
24. Discard disposal			
(backfilling of mining area)			
30. Vehicular activity on haul			
roads; and operation of mining			
equipment			
31. Bulk transporting of Ore to			
market on Public roads			
35. Demolition / removal of			
portable and related			



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infrastructure			
36. Vehicular activity: removal			
of mobile plant / equipment			
and vehicles			
38. Demolition of PCD's			
39. Demolition of workshops,			
waste storage facilities, fuel			
storage facilities etc.			
35. Demolition / removal of			
portable and related			
infrastructure			
36. Vehicular activity: removal			
of mobile plant / equipment			
and vehicles			
37. Rehabilitation of the lay			
down areas			
38. Demolition of PCD's			
39. Demolition of workshops,			
waste storage facilities, fuel			
storage facilities etc.			



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Hydrocarbon	Regular inspections of areas prone to hydrocarbon spills and	(1) All staff	(1) Review of the Water
Contamination	contamination must be inspected on a regular basis.	(2) Environmental	management plan as or when
		Control	required
	Contamination the affected environment will require remediation actions.	Officer/Environment	(2) Review of Storm water
	Soil contamination	al Officer/ SHEQ	Management plan as or when
	Son contamination	Officer	required
	After completion of remediation actions it is recommended that samples	(3) Project	(3) Annual review of the
	be taken to ensure the soil quality comply with the rehabilitation	Management	Emergency preparedness and
	objectives.		response plan or review after
			occurrence of emergency
	Water contamination		incident
	Water consists about the following to consist and with level		(4) Review of
			vehicle/plan/equipment
	thresholds and the baseline data as specified in Appendix L & M.		maintenance plan as or when
	Records to be kept of monitoring activities.		required
	·		(5) Daily inspections of
			vehicles/plant/equipment
			(6) Weekly inspections of
			hazardous substances storage
			facilities
			(7) Review of Hazardous
			substances management plan as
			or when required
			(8) Weekly inspections of spill
			prevention equipment
	•	Contamination must be inspected on a regular basis. Contamination the affected environment will require remediation actions. Soil contamination After completion of remediation actions it is recommended that samples be taken to ensure the soil quality comply with the rehabilitation objectives.	Contamination must be inspected on a regular basis. Control Contamination the affected environment will require remediation actions. Soil contamination After completion of remediation actions it is recommended that samples be taken to ensure the soil quality comply with the rehabilitation objectives. Water contamination Water samples should be taken to ensure compliance with legal thresholds and the baseline data as specified in Appendix L & M.



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boreholes			
40 Tanasil and subsail			
18.Topsoil and subsoil			
stripping & stockpiling for			
mining operation area			
19.Opencast mining			
excavations			
20.Drilling & Blasting			
21 DoM 9 product stockniling			
21. RoM & product stockpiling			
23. Screening Operations			
24. Discard disposal			
(backfilling of mining area)			
27. River crossings			
27. Med Grossings			
29. Storage of fuel and			
lubricants in temporary			
facilities			
00 Valla la conflicta de la con			
30. Vehicular activity on haul			
roads; and operation of mining			
equipment			
35. Demolition / removal of			



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portable and related			
infrastructure			
36. Vehicular activity: removal			
of mobile plant / equipment			
and vehicles			
38. Demolition of PCD's			
39. Demolition of workshops,			
waste storage facilities, fuel			
storage facilities etc.			

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Г			1
20.Drilling & Blasting			
21. RoM & product stockpiling			
22. Residue stockpiles			
23. Screening Operations			
24. Discard disposal			
(backfilling of mining area)			
25. Waste generation, storage			
and disposal			
26. Chemical Toilets			
29. Storage of fuel and			
lubricants in temporary			
facilities			
33. Rehabilitation of mining			
areas			
35. Demolition / removal of			
portable and related			
infrastructure			
37. Rehabilitation of the lay			



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down areas		
38. Demolition of PCD's		
39. Demolition of workshops,		
waste storage facilities, fuel		
storage facilities etc.		



1. Access and hauling along	Vegetation and	A plant search and rescue management plan must be developed and	(1) Environmental	(1) Review of soil conservation
roads i.e. during the	habitat loss	address at least the following:	Control	management plan as or when
construction of roads			Officer/Environment	required
		Recommendations made in the Biodiversity assessment	al Officer/ SHEQ	(2) Frequent quantification of
2. Site clearing and topsoil		attached as Appendix G	Officer	available fertile soil for
stripping for lay down area and		Address requirements issued on the plant species permit	(2) Project	rehabilitation
all related mining		obtained	Management	(3) Review of storm water
infrastructure		Method of quantification and record keeping of search and		management plan as or when
0.01		rescued plants		required
6. Storm water runoff		Method of reinstating vegetation and ensuring rehabilitation		(4) Annual or frequency
management features		objective is reached		stipulated by the competent
18.Topsoil and subsoil				authority compliance auditing
stripping & stockpiling for		A soil conservation management plan must be developed and address at		with the Mine Rehabilitation and
mining operation area		least the following:		closure plan
3 17 11 11 11		Specify mitigation measures that will be implemented to		(5) Annual rehabilitation plan as
19.Opencast mining		prevent contamination of topsoil's and fertile soils		per GN R. 1142
excavations				(6) Review of the Environmental
		Identify measures to be implemented preventing the loss of		Rehabilitation risk assessment a
21. RoM & product stockpiling		topsoil and fertile soils		stipulated by the competent
22. Residue stockpiles		Record keeping of available topsoil and fertile soil for use		authority
22. Nesidue stockpiles		during the rehabilitation phase of an activity		(7) Frequent quantification review
33. Rehabilitation of mining		Monitoring requirements		of search and rescued species
areas		Listed activities must be monitored frequently to ensure compliance with		(8) Annual review or frequency
		the EMPr, EA, and closure plan.		as stipulated by the permit of
37. Rehabilitation of the lay		ule EMPT, EA, and Closure plan.		plant removal permits
				Piant removal pennits



down areas				
		Records to be kept of monitoring activities.		
1. Access and hauling along	Noise generation	A Noise monitoring programme to be developed and address at least the	(1) Environmental	(1) Monthly reporting on
roads i.e. during the		following:	Control	compliance with the Noise quality
construction of roads		Frequency of monitoring	Officer/Environment	standards as per
		Method of monitoring	al Officer/ SHEQ	recommendations in Appendix F
2. Site clearing and topsoil		Compliance with the National Noise Control Regulations and	Officer	(2) Review of
stripping for lay down area and		SANS10103:2008 guidelines	(2) Project	vehicle/plan/equipment
all related mining		Mitigation measures to prevent noise generation	Management	maintenance plan as or when
infrastructure			(3) Acoustical	required
5. Mining offices (construction		Listed activities must be monitored frequently to ensure compliance with	Consultant	(3) Frequent inspections of
and operation) i.e. operation of		the EMPr, EA, and closure plan.		vehicles/plant/equipment
training centres, offices and		Departs to be kept of manifering activities		
kitchen facilities		Records to be kept of monitoring activities.		
		Vehicles/plant/equipments must be inspected on a regular basis.		
9.Stores, workshops &wash		Records of these inspections must be kept.		
bays				
11. Fuel operating power				
generators				
18.Topsoil and subsoil				
stripping & stockpiling for				
mining operation area				
19.Opencast mining				



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excavations			
20.Drilling & Blasting			
21. RoM & product stockpiling			
23. Screening Operations			
24. Discard disposal			
(backfilling of mining area)			
30. Vehicular activity on haul			
roads; and operation of mining			
equipment			
33. Rehabilitation of mining			
areas			
35. Demolition / removal of			
portable and related			
infrastructure			
36. Vehicular activity: removal			
of mobile plant / equipment			
and vehicles			
38. Demolition of PCD's			
39. Demolition of workshops,			



waste storage facilities, fuel storage facilities etc.			
18.Topsoil and subsoil stripping & stockpiling for mining operation area	Destruction of Wetlands	Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times. Compliance with the requirements must be monitored. A Water Management plan must be developed and address at least the following: • Frequency of monitoring • Methods on addressing the requirements set out by the WUL • Compliance of water quality and monitoring of the constituents recommended in Appendix L & M • Description of mitigation measure to be implemented • Compliance with legal thresholds • Quantification of production related water balances Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Records to be kept of monitoring activities.	(1) Review of Water management plan as or when required (2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in Appendix L & M (3) Weekly inspections of diversion infrastructures (4) WUL audits as specified in licensing requirements



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1. Access and hauling along
roads i.e. during the
construction of roads

2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure

- 6. Storm water runoff management features
- 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

Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times.

Compliance with the requirements must be monitored.

A Water Management plan must be developed and address at least the following:

- Frequency of monitoring
- Methods on addressing the requirements set out by the WUL
- Compliance of water quality and monitoring of the constituents recommended in Appendix L & M
- Description of mitigation measure to be implemented
- Compliance with legal thresholds
- Quantification of production related water balances

A Storm water management plan must be developed and address at least the following:

- Recommendations made in the conceptual storm water management plan in Appendix L
- Requirements to monitor the functionality of storm water infrastructure
- Frequency of monitoring
- Dirty water containment methods and frequent quantification and control of volumes

(1) Environmental
Control
Officer/Environment
al Officer/ SHEQ
Officer
(2) Project
Management

- (1) Review of storm water management plan as or when required
- (2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in
- (3) Frequent inspections of diversion infrastructures

Appendix L & M

(4) WUL audits as specified in licensing requirements



1. Access and hauling along roads i.e. during the construction of roads 18. Topsoil and subsoil stripping & stockpiling for mining operation area 19. Opencast mining excavations 32. Water Management	Destruction of upstream tributaries and reduction in water in the catchment	Water quality monitoring requirements Methods addressing requirements set out in the WUL Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Records to be kept of monitoring activities. Monitoring requirements as stipulated by the conditions of the WUL must be complied with at all times. Compliance with the requirements must be monitored. A Water Management plan must be developed and address at least the following: Frequency of monitoring Methods on addressing the requirements set out by the WUL Compliance of water quality and monitoring of the constituents recommended in Appendix L & M	(1) Environmental Control Officer/Environment al Officer/ SHEQ Officer (2) Project Management	(1) Review of storm water management plan as or when required (2) Monthly reporting or frequency specified in the WUL on the compliance of water quality results as specified in Appendix L & M (3) Frequent inspections of diversion infrastructures (4) WUL audits as specified in licensing requirements
				Appendix L & M
		A Storm water management plan must be developed and address at least the following: • Recommendations made in the conceptual storm water		



			T	T
		management plan in Appendix L		
		Requirements to monitor the functionality of storm water		
		infrastructure		
		Frequency of monitoring		
		Dirty water containment methods and frequent quantification		
		and control of volumes		
		Water quality monitoring requirements		
		Methods addressing requirements set out in the WUL		
		Listed activities must be monitored frequently to ensure compliance with		
		the EMPr, EA, and closure plan.		
		Records to be kept of monitoring activities.		
		Treast as to be rept of mornialing additions.		
1. Access and hauling along	Sedimentation and	Monitoring requirements as stipulated by the conditions of the WUL must	(1) Environmental	(1) Review of storm water
roads i.e. during the	siltation of	be complied with at all times.	Control	management plan as or when
construction of roads	watercourses		Officer/Environment	required
		Compliance with the requirements must be monitored.	al Officer/ SHEQ	(2) Monthly reporting or
2. Site clearing and topsoil		A Water Management plan would be developed and address at least the	Officer	frequency specified in the WUL
stripping for lay down area and		A Water Management plan must be developed and address at least the	(2) Project	on the compliance of water
all related mining		following:	Management	quality results as specified in
infrastructure		Frequency of monitoring		Appendix L & M
6. Storm water runoff		Methods on addressing the requirements set out by the WUL		(3) Frequent inspections of
		Compliance of water quality and monitoring of the constituents		diversion infrastructures
management features		recommended in Appendix L & M		(4) WUL audits as specified in
15. Transport of construction		Description of mitigation measure to be implemented		licensing requirements
_		2 000pilon of magadon modelare to be implemented		



material, mobile plant and		Compliance with legal thresholds		
equipment to the site				
equipment to the site		Quantification of production related water balances		
18.Topsoil and subsoil		A Storm water management plan must be developed and address at		
stripping & stockpiling for		least the following:		
mining operation area				
		Recommendations made in the conceptual storm water		
19.Opencast mining		management plan in Appendix L		
excavations		Requirements to monitor the functionality of storm water		
		infrastructure		
21. RoM & product stockpiling		Frequency of monitoring		
22. Residue stockpiles		Dirty water containment methods and frequent quantification		
22. Nesidue stockpiles		and control of volumes		
33. Rehabilitation of mining		Water quality monitoring requirements		
areas		Methods addressing requirements set out in the WUL		
		iviethous addressing requirements set out in the WOL		
36. Vehicular activity: removal		Listed activities must be monitored frequently to ensure compliance with		
of mobile plant / equipment		the EMPr, EA, and closure plan.		
and vehicles		, , , , , , , , , , , , , , , , , , , ,		
		Records to be kept of monitoring activities.		
37. Rehabilitation of the lay				
down areas				
4. Access and baulium along	Matanagas	Maritan and annual victor victor to the dust assume and	(4) Environment-1	(4) Francisco de manada a manad
1. Access and hauling along	Water usage for	Monitor and record water usage for dust suppression.	(1) Environmental	(1) Frequent reporting on the
roads i.e. during the	dust suppression	Promoting the re-use of water contained as specified in the Storm water	Control	compliance of water quality
construction of roads		Management plan is recommended. However the water quality should be	Officer/Environment	results as specified in Appendix
		inianagement plan is recommended. However the water quality should be	al Officer/ SHEQ	L&M



		tested to ensure legal compliance before re-use. The operational water balances must be monitored and reviewed on a frequent basis as to ensure compliance with the WUL requirements. Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Records to be kept of monitoring activities.	Officer (2) Project Management	(2) Daily recoding of water usage for dust suppression (3) Frequent review of operational water balances (4) WUL audits as specified in licensing requirements
4. Onsite Clinic 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities	Domestic water usage	Monitor and record water usage for dust suppression. Promoting the re-use of water contained as specified in the Storm water Management plan is recommended. However the water quality should be tested to ensure legal compliance before re-use. The operational water balances must be monitored and reviewed on a frequent basis as to ensure compliance with the WUL requirements. Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Records to be kept of monitoring activities.	(1) Environmental Control Officer/Environment al Officer/ SHEQ Officer (2) Project Management	(1) Frequent reporting on the compliance of water quality results as specified in Appendix L & M (2) Daily recoding of water usage for dust suppression (3) Frequent review of operational water balances (4) WUL audits as specified in licensing requirements
Access and hauling along roads i.e. during the construction of roads Site clearing and topsoil	Influx of alien invasive vegetation	An alien eradication and control management plan must be developed and address at least the following: • Identification of areas prone to alien species in accordance with the applicable regulations and Appendix G	(1) Environmental Control Officer/Environment al Officer/ SHEQ	(1) Review of alien eradicationand control management plan asor when required(2) Weekly inspection of site for



stripping for lay down area and		Reference to recommendations made in Appendix G	Officer	the visible signs of alien species
all related mining		Frequency of monitoring and inspection requirements of areas	(2) Project	establishment
infrastructure		prone to establishment	Management	
5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities 18. Topsoil and subsoil stripping & stockpiling for		 Eradication methods Including requirements stipulated in the legal requirements stipulated in Table 16 Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Records to be kept of monitoring activities. 	(3) Herbicide consultant	
mining operation area 19. Opencast mining excavations 21. RoM & product stockpiling				
33. Rehabilitation of mining areas37. Rehabilitation of the lay down areas				
Access and hauling along roads i.e. during the construction of roads	CO ₂ emissions & Release of noxious gasses	Frequent monitoring and reporting of the Spitsvale Project carbon footprint.	(1) Environmental Control Officer/Environment al Officer/ SHEQ	(1) Frequent reporting of the Spitsvale Carbon footprint status



2 Site alegains and tongell	Officer	
2. Site clearing and topsoil	(2) Project	
stripping for lay down area and	Management	
all related mining		
infrastructure		
9.Stores, workshops &wash		
bays		
44 Fuel anareting name		
11. Fuel operating power		
generators		
15. Transport of construction		
material, mobile plant and		
equipment to the site		
18.Topsoil and subsoil		
stripping & stockpiling for		
mining operation area		
19.Opencast mining		
excavations		
oxourumono		
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				
36. Vehicular activity: removal				
of mobile plant / equipment				
and vehicles				
			, , , , , , , , , , , , , , , , , , ,	(4)
2. Site clearing and topsoil	Topography and	Monitoring adherence with the requirements set out by GN R. 1142.	(1) Environmental	(1) Annual compliance auditing or
stripping for lay down area and	visual alteration	December to be book of our construction to accompany. Alternation to be	Control	frequency stipulated by the
all related mining		Records to be kept of pre-construction topography. Alteration to be	Officer/Environment	competent authority with the
infrastructure		monitored and managed in accordance with the rehabilitation objectives.	al Officer/ SHEQ	Mine Rehabilitation and closure
		Listed activities must be monitored frequently to ensure compliance with	Officer	plan
5. Mining offices (construction		the EMPr, EA, and closure plan.	(2) Project	(2) Review of the Annual
and operation) i.e. operation of		the Livir 1, LA, and Gosule plan.	Management	rehabilitation plan as stipulated
training centres, offices and		Records to be kept of monitoring activities.		by GN R. 1142
kitchen facilities		g		(3) Annual review of the
18.Topsoil and subsoil				Environmental Rehabilitation risk
stripping & stockpiling for				assessment
				(4) Frequent inspection of mining
mining operation area				areas
19.Opencast mining				
. •				



excavations				
21. RoM & product stockpiling				
22. Residue stockpiles				
Access and hauling along roads i.e. during the construction of roads	Erosion	A Storm water management plan must be developed and address at least the following:	(1) Environmental Control Officer/Environment	(1) Review of soil conservation management plan as or when required
2. Site clearing and topsoil stripping for lay down area and all related mining infrastructure		 Recommendations made in the conceptual storm water management plan in Appendix L Requirements to monitor the functionality of storm water infrastructure 	al Officer/ SHEQ Officer (2) Project Management	(2) Frequent quantification of available fertile soil for rehabilitation(3) Review of storm water
6. Storm water runoff management features		 Frequency of monitoring Dirty water containment methods and frequent quantification and control of volumes Water quality monitoring requirements 		management plan as or when required (4) Annual compliance auditing or frequency stipulated by the
15. Transport of construction material, mobile plant and equipment to the site		 Methods addressing requirements set out in the WUL A soil conservation management plan must be developed and address at least the following: 		competent authority with the Mine Rehabilitation and closure plan (5) Annual rehabilitation plan as
18.Topsoil and subsoil stripping & stockpiling for mining operation area 19.Opencast mining		 Specify mitigation measures that will be implemented to prevent contamination of topsoil's and fertile soils Identify measures to be implemented preventing the loss of topsoil and fertile soils 		required by GN R.1142 (6) Annual review of the Environmental Rehabilitation risk assessment as required by GN R.1142
excavations		Record keeping of available topsoil and fertile soil for use		13.1142



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	during the rehabilitation phase of an activity	
21. RoM & product stockpiling	Monitoring requirements	
24. Discard disposal		
·	Areas prone to erosion must be monitored frequently to ensure	
(backfilling of mining area)	compliance with the EMPr, EA, and closure plan.	
27. River crossings		
27. Kiver crossings	Records to be kept of monitoring activities.	
30. Vehicular activity on haul		
roads; and operation of mining		
equipment		
32. Water Management		
33. Rehabilitation of mining		
areas		
35. Demolition / removal of		
portable and related		
infrastructure		
36. Vehicular activity: removal		
of mobile plant / equipment		
and vehicles		
37. Rehabilitation of the lay		
down areas		
38. Demolition of PCD's		



39. Demolition of workshops,				
waste storage facilities, fuel storage facilities etc.				
8. Pollution Control Dams	Contamination of	Monitoring requirements as stipulated by the conditions of the WUL must	(1) Environmental	(1) Auditing of IWWMP according
(PCD's) i.e. Construction and operation	water resources	be complied with at all times. Compliance with the requirements must be monitored.	Officer/Environment	to the specified time frames stipulated in the WUL
9.Stores, workshops &wash bays		A Water Management plan must be developed and address at least the following:	al Officer/ SHEQ Officer (2) Project	(2) Review of IWWMP according to the specified time frames stipulated in the WUL
10. Ablutions & change house with sewage treatment plant		 Frequency of monitoring Methods on addressing the requirements set out by the WUL 	Management	(3) Monthly reporting or frequency specified in the WUL on the compliance of water
11. Fuel operating power generators		Compliance of water quality and monitoring of the constituents recommended in Appendix L & M		quality results as specified in Appendix L & M
13. Fuel storage		 Description of mitigation measure to be implemented Compliance with legal thresholds 		(4) Review of the water management plan as or when
19.Opencast mining excavations		Quantification of production related water balances A Storm water management plan must be developed and address at		required (5) Daily recoding of water usage (6) Frequent review of
20.Drilling & Blasting		least the following:		operational water balances (7) WUL audits as specified in
21. RoM & product stockpiling		Recommendations made in the conceptual storm water management plan in Appendix L		licensing requirements (8) Review of storm water
22. Residue stockpiles		Requirements to monitor the functionality of storm water		management plan as or when



	infrastructure	required
23. Screening Operations	Frequency of monitoring	(9) Annual review of the
24. Discard disposal	Dirty water containment methods and frequent quantification	Emergency preparedness and
(backfilling of mining area)	and control of volumes	response plan or review after
(3.20	Water quality monitoring requirements	occurrence of emergency
25. Waste generation, storage	Methods addressing requirements set out in the WUL	incident
and disposal		(10) Weekly inspections of spill
	The compliance of the IWWMP approved by the Department of Water	prevention equipment
26. Chemical Toilets	Affairs must be monitored as frequently as indicated by the WUL.	
27. River crossings	Listed activities must be monitored frequently to ensure compliance with	
28. Water supply (potable &	the EMPr, EA, and closure plan.	
process)	Records to be kept of monitoring activities.	
29. Storage of fuel and		
lubricants in temporary		
facilities		
32. Water Management		
38. Demolition of PCD's		
39. Demolition of workshops,		
waste storage facilities, fuel		
storage facilities etc.		



2. Site clearing and topsoil	Destruction of	Sites identified by Appendix O must be monitored frequently to ensure	(1) Environmental	(1) Frequent inspections of
stripping for lay down area and	graves	compliance with the EMPr, EA, and closure plan.	Control	marked graves to ensure no
all related mining			Officer/Environment	disturbance
infrastructure		Records to be kept of monitoring activities.	al Officer/ SHEQ	
			Officer	
18.Topsoil and subsoil			(2) Project	
stripping & stockpiling for			Management	
mining operation area			(3) Suitable	
			accredited and	
			qualified	
			archaeologist	
2. Site clearing and topsoil	Degradation of	Sites identified by Appendix O must be monitored frequently to ensure	(1) Environmental	(1) Frequent inspections of
stripping for lay down area and	cultural significance	compliance with the EMPr, EA, and closure plan.	Control	marked heritage sites to ensure
all related mining	heritage sites	,	Officer/Environment	no disturbance
infrastructure	g.	Records to be kept of monitoring activities.	al Officer/ SHEQ	
			Officer	
18.Topsoil and subsoil			(2) Project	
stripping & stockpiling for			Management	
mining operation area			(3) Suitable	
			accredited and	
			qualified	
			archaeologist	
			aronacologist	
1				<u> </u>



4. Onsite Clinic 5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities 12. Lighting	Electricity usage	Frequent monitoring and reporting on the use of electricity. Frequent monitoring and reporting of the Spitsvale Project carbon footprint. Records to be kept of such monitoring activities.	(1) Environmental Control Officer/Environment al Officer/ SHEQ Officer (2) Project Management	(1) Frequent reporting of electricity usage (2) Frequent reporting of the Spitsvale Carbon footprint status
4. Onsite Clinic	Medical Waste generation	A Waste management plan must be developed and address at least the following: • Identification of possible waste streams both hazardous and general • Description of method to re-use, reduce, recycle, or avoid waste generation • Monitoring requirements • Quantification of waste streams • Description of mitigation measures • Compliance with regulations stipulated in Table 16 The Spitsvale Health and safety management plan must at least include the following specific environmental related requirements: • Management of medical waste • Management of hazardous substances On-going monitoring and recording of medical waste generation.	(1) Health and safety officer (2) Project Management (3) All trained first aid staff	(1) Review of the Spitsvale Mine Health and Safety management plan as or when required (2) Review of the on-site Clinic management plan as or when required (3) Frequent inspection of medical waste facilities (4) Monthly reporting of medical waste generation



5. Mining offices (construction and operation) i.e. operation of training centres, offices and kitchen facilities 35. Demolition / removal of portable and related infrastructure 38. Demolition of PCD's 39. Demolition of workshops, waste storage facilities, fuel storage facilities etc.	General waste generation & Littering	A Waste management plan must be developed and address at least the following: Identification of possible waste streams both hazardous and general Description of method to re-use, reduce, recycle, or avoid waste generation Monitoring requirements Quantification of waste streams Description of mitigation measures Compliance with regulations stipulated in Table 16 On-going monitoring, reporting and recording of all waste streams are required. Frequent inspections of waste disposal facilities or areas to take place. Records to be kept of such monitoring activities.	(1)Frequent inspection of on-site waste disposal facilities and sites (2) Review of the Spitsvale Waste Management plan as or when required
22. Residue stockpiles 25. Waste generation, storage and disposal	Hazardous Leachate	A Waste management plan must be developed and address at least the following: Identification of possible waste streams both hazardous and general Description of method to re-use, reduce, recycle, or avoid waste generation Monitoring requirements Quantification of waste streams	(1)Frequent inspection of on-site waste disposal facilities and sites (2) Review of the Spitsvale Waste Management plan as or when required (3) Monthly reporting or frequency specified in the WUL on the compliance of water



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		 Description of mitigation measures Compliance with regulations stipulated in Table 16 On-going monitoring, reporting and recording of all waste streams are required. Monitoring, auditing, and reporting of compliance with the Waste Management Licence will be required as specified in the authorisation. 	quality results as specified in Appendix L & M (4) Frequent inspection of waste disposal facilities (5) Compliance audit with the WML as specified by the competent authority
25. Waste generation, storage and disposal	Illegal dumping	A Waste management plan must be developed and address at least the following: Identification of possible waste streams both hazardous and general Description of method to re-use, reduce, recycle, or avoid waste generation Monitoring requirements Quantification of waste streams Description of mitigation measures Compliance with regulations stipulated in Table 16 On-going monitoring, reporting and recording of all waste streams are required. Frequent inspections of waste disposal facilities or areas to take place. Records to be kept of such monitoring activities.	(1)Frequent inspection of on-site waste disposal facilities and sites (2) Review of the Spitsvale Waste Management plan as or when required

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7. Water storage facilities	Improper water	Monitor and record water usage for dust suppression.	(1) Environmental	(1) Frequent reporting on the
28. Water supply (potable & process) 32. Water Management	storage management	Promoting the re-use of water contained as specified in the Storm water Management plan is recommended. However the water quality should be tested to ensure legal compliance before re-use. The operational water balances must be monitored and reviewed on a frequent basis as to ensure compliance with the WUL requirements. Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Frequent inspection of water storage facilities is required.	Control Officer/Environment al Officer/ SHEQ Officer (2) Project Management	compliance of water quality results as specified in Appendix L & M (2) Daily recoding of water usage for dust suppression (3) Frequent review of operational water balances (4) WUL audits as specified in licensing requirements
		Records to be kept of monitoring activities.		
8. Pollution Control Dams (PCD's) i.e. Construction and operation 10. Ablutions & change house with sewage treatment plant 26. Chemical Toilets	Smell nuisance	A Waste management plan must be developed and address at least the following: Identification of possible waste streams both hazardous and general – include the management of effluent Description of method to re-use, reduce, recycle, or avoid waste generation Monitoring requirements Quantification of waste streams Description of mitigation measures Compliance with regulations stipulated in Table 16		(1) Frequent reporting on the compliance of water quality results as specified in Appendix L & M (2) Review of the Spitsvale Waste Management plan as or when required (3) Frequent inspections of infrastructure associated ablution, sewage, and chemical toilet facilities



		Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Frequent inspection of sewage and chemical toilet facilities is required. Records to be kept of monitoring activities.		
9.Stores, workshops &wash bays 11. Fuel operating power generators 13. Fuel storage 29. Storage of fuel and lubricants in temporary facilities	Chemical Fires	A hazardous substance management plan must be developed and address at least the following: • Storage, transport, handling, and disposal requirements according to the legislative requirements listed in Table 16 • Fire prevention methods including the description of equipment to be available for emergency situations • Health and safety requirements • Monitoring requirements A fire prevention plan must be developed and address at least the following: • Identification of all fire risks associated to the Spitsvale project • Describe preventative measures and include equipment • Monitoring of fire prevention equipment and high risk areas A Emergency preparedness and response plan to be developed and address at least the following: • Identifying possible emergency situations – include Chemical fires	(1) Health and safety officer (2) Site management	(1) Review of fire prevention plan as or when required (2) Frequent inspections of fire prevention equipment (3) Annual review of the Emergency preparedness and response plan or review after occurrence of emergency incident (4) Frequent inspections of hazardous substances storage facilities (5) Review of Hazardous substances management plan as or when required (6) Frequent inspections of spill prevention equipment



		 Describe preventative measures Describe procedure to be followed in the case of a emergency Include emergency contact details Include monitoring requirements of preventative measures and or equipment Appoint responsible persons Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Frequent inspection of hazardous substances storage facilities is required. Records to be kept of monitoring activities. 		
12. Lighting	Light pollution	Monitoring of the effects posed by light pollution.	(1) Project management (2) Environmental Control Officer/Environment al Officer/SHEQ Manager	(1) Biennial investigation and reporting
13. Fuel storage	Emission of noxious fumes	A hazardous substance management plan must be developed and address at least the following: • Storage, transport, handling, and disposal requirements according to the legislative requirements listed in Table 16	(1) Health and safety officer (2) Site management	(1) Annual review of the Emergency preparedness and response plan or review after occurrence of emergency



14 Employment of workers	Locs of form labour	 Fire prevention methods including the description of equipment to be available for emergency situations Health and safety requirements Monitoring requirements A Emergency preparedness and response plan to be developed and address at least the following: Identifying possible emergency situations – include Chemical fires Describe preventative measures Describe procedure to be followed in the case of a emergency Include emergency contact details Include monitoring requirements of preventative measures and or equipment Appoint responsible persons Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Frequent inspection of fuel storage facilities is required. Records to be kept of monitoring activities. 	(1) Company	incident (2) Frequent inspections of hazardous substances storage facilities (3) Review of Hazardous substances management plan as or when required (4) Frequent inspections of spill prevention equipment
14. Employment of workers and procurement of construction materials.	Population Influx – Pressure on	Frequent monitoring of compliance with the Social Labour plan. A grievance procedure to be developed and address at least the following:	(1) Company Directors (2) Human	(1) Review of Social Labour plan as required by legislation and the competent authority

17. Employment of workers	Resources Population Influx – Social Pathologies Population Influx – Community Conflict Health and Safety of employees Job Creation and Skills Training Job Creation (Multiplier affect) and Population Influx	 Procedure for recoding and addressing all complaints received by mine employees, contractors, or sub-contractors and surrounding I&AP. The Spitsvale Health and safety management plan must at least include the following specific environmental related requirements: Considers recommendations in Appendix N Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan. Records to be kept of monitoring activities. 	Resource manager (3) Project manager (4) SHEQ/ Health and Safety Manger	(2) Review of grievance procedure as or when required (3) Ongoing recording of complaints received by I&AP (4) Review of Spitsvale Health and Safety management plan as or when required
20.Drilling & Blasting	Damage to surrounding landowner properties	A drilling and blasting management plan must be developed and address at least the following: Methods used for drilling and blasting Safety requirements including	(1) Blastingsupervisor/officer.(2) Blastingengineer.	(1) Review of drilling and blasting management plan as or when required(2) Frequent monitoring of areas
		 Monitoring requirements Assessment of possible risks trough a risk assessment Listed activities must be monitored frequently to ensure compliance with 	(3) Projectmanagement(4) Health andsafety	affected by blasting activities



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		the EMPr, EA, and closure plan.	manager/officer.	
		Records to be kept of monitoring activities.		
31. Bulk transporting of Ore to	Pressure on public	A traffic management plan must be developed and address at least the	(1) Health and	(1) Review of traffic management
market on Public roads	transport	following:	Safety	plan as or when required
	infrastructure	Recommendations made in Appendix P	Manager/Officer.	(2) Frequent monitoring of traffic
		Monitoring requirements	(2) Project	related issues
		Legal requirements	management.	
		Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan.		
		Records to be kept of monitoring activities.		

ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR THE SPITSVALE MINING PERMIT APPLICATION AND ASSOCIATED ACTIVITIES

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(I) Indicate the frequency of the submission of the performance assessment report

Section 34 of GN R. 982 stipulates the requirements for auditing compliance with the Environmental Authorisation (EA), the EMPr, and the closure plan (in compliance with GN R. 1147).

It requires the holder of the authorisation, for the period during which the EA, EMPr, and closure plan 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- (i) 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 (ii) 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 also defined in the regulations and is as follows:

- Determine the ability of 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 on an ongoing basis and to sufficiently provide for the , avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
- To determine the level of compliance with the provisions of environmental authorisation, 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.

The recommendations must be subjected to a public participation process which process has been agreed to by the competent authority and was appropriate to bring the proposed amendment of the EMPr and, where applicable the closure plan, to the attention of potential and registered interested and affected parties, including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, for approval by the competent authority.



ENVIRONMNETAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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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.

It is recommended that this *independent audit* takes place on an annual basis or as specified by the competent authority in the EA, to promote continual improvement on the Spitsvale Project.

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.

It is also recommended that an internal audit specified in the previous section be carried out on a biannual basis, if feasible but at least once before the independent audit.

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 Project (including consultants and contractors) to encourage the implementation of 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 to outline the methodology that will be used to inform the mine's employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid contamination or the degradation of the environment. The awareness plan is primarily a tool to introduce and describe the requirements of the range of environmental and social plans for the Project during the Life of the Project. The environmental awareness plan ensures that training needs are identified and appropriate training is provided.



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The environmental awareness plan should 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.

All employees are required to undergo environmental awareness induction training upon appointment and records of such

training must be obtained and recorded. Refresher induction training must periodically take place.

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 should at least indicate the

following:

Topic;

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- 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;
- Legal requirements;
- EMS 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 not been completed by the time of submitting this report. It is therefore recommended that no decision be made regarding granting authorisation before the documents required by the regulations are not completed and reviewed.

The following additional information was requested by the Department of Minerals and Resources on the acceptance of the scoping report:

Details of the EAP who prepared the report together with his/her expertise

Environmental Management Assistance (Pty) Ltd was appointed in September 2016 to manage the EIA and appointment of Specialist.

Full description of activities to be taken

The appointed EAP has listed all activities to the best of their knowledge.

 Specialist reports should be signed off by an independent specialist if it was prepared by the in-house specialist(s).

All specialist studies were conducted by independent specialist.

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

This requirement has not been addressed in this report. It will be addressed in the Spitsvale Mine Rehabilitation, closure and liability plan that is in process to be developed by an independent specialist. This report will be in compliance with GN R. 1142.



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The total footprint of the proposed development should be indicated.

Appendix C indicates the total footprint of the proposed development.

Should a Water Use License be required, proof of such application should be submitted.

A WULA process is on its way. However an application has not been lodged at the time of submitting this report.

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

This has been addressed in Appendix G.

The impacts of the proposed facility on avifauna and bats must be assessed in the EIA phase.

Both an Avifuna and bat survey was carried out as instructed. The findings have been incorporated into the EIR and EMPr.

Find Appendix H & J.

Possible impacts and effects of the development on the surrounding industrial area.

The social implication of the proposed mining development has been addressed throughout the EIR and the EMPr and has been addressed in a number of specialist reports.

Please find Part A section 1)j) for the summary of findings.

 Information on services required on the site, e.g. sewage, refuge removal, water and electricity should be submitted. Furthermore, information on who will supply these services, agreement thereof and confirmation of the capacity to deliver such services should be submitted.

The services have been identified through the identification of activities associated to the proposed mining development.

The provision of information as to who will supply these services, agreements thereof and the confirmation of the capacity to deliver such services, however have not been confirmed before the submission of this report.

A construction and operational phase in the EMPr should include mitigation and monitoring measures.

Part B of this report fulfils this requirement.

Should blasting be required, appropriate mitigation measures should be provided.

Mitigation and management measures for blasting related activities have been identified in Part B of this report.



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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.

The EAP herewith confirms the following to be excluded from this report:

a. site layout including location of storm water infrastructure, pollution containment dams (PCD's), detailed infrastructure within the Tubatse laydown area.