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## DORSTFONTEIN COAL MINE

### (EWP) ENVIRONMENTAL MANAGEMENT PROGRAMME EAST MINE EXPANSION PROJECT

in terms of the Mineral and Petroleum Resource Development Act (Act 28 of 2002)

DME Ref. No: MP 30/5/1/2/2/51MR

August 2009 updated April 2008

Dept. van Minerale en Energ Witbank 1035 2009 -08- 14 Private Bag X7279 Dept. of Minerals and Energy

Project Number: TCSA.D.07.100 Client Name: Total Coal South Africa





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#### Dorstfontein Coal Mine (Pty) Ltd East Mine Expansion Project

#### ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP)

April 2008 hopated with 2009

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#### **EXECUTIVE SUMMARY**

#### Dorstfontein Coal Mines Background

Dorstfontein Coal Mines (DCM) is owned by Total Coal South Africa (TCSA) (74%) and Mmakau Mining

(26%), its Black Economic Empowerment Partner.

The mine is an outsourced operation with underground mining and coal processing conducted by

contractors and TCSA retaining general management and marketing control.

DCM (comprising the existing West Mine and proposed East Mine), is situated on portions of the farms Dorstfontein 71 IS, Boschkrans 53 IS, Fentonia 54 IS, Rietkuil 58 IS and Welstand 55 IS, located within the Emalahleni Local Council, Mpumalanga. The current operation lies directly north-east of the town of Ga-

DCM is in a joint venture (JV) with Xstrata Coal. The JV has an arrangement with RBCT to supply the

terminal with 2 million tonnes per annum (mtpa) of coal for export.

The DCM mining operation has an approved Environmental Management Plan (EMP) 2005, for the

underground mining of the No. 2 and No. 4 coal seam and a pending EMP amendment for the establishment of a bulk sample on the existing mine (West Mine), which will serve to determine the

quality and grade of the No. 4 Seam.

#### Project Background

The JV between TCSA and Xstrata will terminate in December 2009, which will make DCM responsible to fulfil the 2 million tonnes per annum (mtpa) RBCT entitlement. The additional coal supply requirement will necessitate the expansion of the current DCM activities in order to provide for the entitlement.

#### Project Introduction

The required expansion of the current DCM activities will be referred to as the DCM Expansion Project. In order for the Expansion Project to be economically feasible, the following infrastructure will be required:

- New plant and associated infrastructure;
- Two (2) new opencast operations;
- Initiation of the three (3) underground mining blocks;
   Co-disposal Facility, which will accommodate the waste
- Co-disposal Facility, which will accommodate the waste rock from the mining operations and the waste material from the proposed plant;
- Transportation (i.e. roads and conveyors);
- Water supply, which will be obtained from the old defunct TNC mine workings;
- Pipeline transporting water from the old TMC mine to the plant;
- Power supply, which will be provided by Eskom;
- Sewage treatment; and
- Railway line and associated power requirements to transport coal to the RBCT.

All new infrastructure with the exception of the proposed railway line will be situated within the existing mining area. It is planned that the railway line will be established within an existing servitude of the previous TMC railway line with some sections requiring extension and expansion. Coal will be transported from the plant via conveyor to a rapid load out facility from where the train wagons will be loaded to transport the coal to the RBCT. The new rapid load-out facility associated with the new railway line will be required to be in close proximity to the plant to link to the RBCT coal line to the north of the project area. The railway line is proposed to pass through portions of the following farms: Vandyksdrift 1915, steenkoolspruit 1815, Kromfontein 3015, Middeldrift 4215, Rietfontein 4315, Lourens 47215, Vlaklaagte 4515, Welstand 5515, Clydesdale 48315 and Vaalkranz 2915.

#### Mining Method Description

DCM is currently mining the No. 2 coal seam (and has approval to mine the No. 4 seam) via underground mining operations on the western portion of the mining rights area.

The expansion project will necessitate the inclusion of the extensive No. 4 coal seam overlying the No. 2 coal seam overlying the No. 2 coal seam, which has been identified as the preferred resource to ensure a production profile of 2mtpa. In addition to this the No. 1, 3 and 5 coal seams will be mined. All resources less than 40m deep will be accessed via the opencast operations, whereas the deeper lying coal will be accessed via underground

mining operations.

Construction activities are planned to commence during end 2008, while full production will take place in 2010. Initial coal production is planned from opencast operations at the East Mine (PIT 1 and PIT 2). The opencast production rate has been determined at a constant rate of 3mtpa of Run of Mine (RoM) for the first six (6) to seven (7) years of the Expansion Project, which equates to an overall coal extraction of 21

million tonnes RoM. During year 6 the project will ramp up to 2.94mtpa. Underground production will commence from the opencast high walls on No. 4 and No. 2 seams on the East Mine and is planned at 2.52mtpa RoM. This will be supplemented by 420 000tpa from the remaining reserves of the opencast blocks on the East Mine.

RoM from the opencast pits will be transported via conveyors to the plant Discard will be conveyed from the plant to a new co-disposal facility by conveyor for the coarse fraction and by pipeline for the slurry fraction at a rate of approximately 205 tonnes per hour (tph). The codisposal facility will be designed to hold 2.9 million tonnes of slurry within an outer wall of 33.1 million tonnes of coarse fraction discard over the life of mine (LoM). The project will ensure a LoM in excess of

Z5 years.

#### Environmental Authorisation Process

The DCM Expansion Project's EIA/EMP was undertaken in accordance with the Mineral Petroleum Resource Development Act (Act 28 of 2002) (MPRDA), Mational Environmental Management Act (Act Mo. 107 of 1998) (NEMA), and other relevant environmental legislation, including the National Water Act (Act

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This report (Volume 1 and 2) pertains specifically to the MPRDA. A second process in terms of the NEMA is in process for all listed activities in terms of Regulation 385 and 386. This report will be submitted to

all stakeholders in the following month.

In terms of Section 39 (1) of the Mineral Petroleum Resource Development Act (Act 28 of 2002) (MPRDA), DCM is required to conduct an environmental assessment and submit an EIA/EMP to the DME, in respect of any new operations and/or expansions of the mine. The EIA ensures that the needs of the environment (biophysical and socio-economic) are identified. The EMP in turn provides a tool for meeting the objective to reduce or avoid negative environmental impacts associated with a project within a certain environment by providing detailed mitigation measures and management commitments.

All of these sections will become legally binding on the approval of this report.

All of these sections will become legally binding on the approval of this report.

As a prerequisite to the EIA/EMP, in accordance to the MPRDA, a Scoping Report, was submitted to the Department of Minerals and Energy, Mpumalanga and all stakeholders on 12 December 2007. The Scoping Report provided an overview of the project and detailed the issues identified and obtained from Stakeholders to that date, and also listed the recommended specialist investigations that needed to be

Parallel to the submission of the Scoping Report in terms of the MPRDA, a Scoping Report in terms of the NEMA was submitted to the Mpumalanga Department of Agriculture and Land Affairs (MDALA) and all

Stakeholders for review on 27 March 2008.

This report serves as the final phase of the environmental investigations, in which the detailed specialist investigations are portrayed. It provides a detailed description of the environmental setting and envisaged impacts and recommended management measures to be implemented. The EIA /EMP will be further refined through a consultation process with the identified stakeholders and authorities.

#### Public Participation Process (Consultation Process)

Background

Public Participation Process (PPP) is a requirement of the EIA and EMP process and ensures that all relevant I&APs are consulted and involved. The process ensures that all stakeholders have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures

for a complete comprehensive environmental study. A comprehensive PPP was initiated at an early stage in both Scoping Phases in order for the concerns of l&APs, authorities and the wider public to be recognised. The PPP has been an ongoing process undertaken throughout the EIA and EMP phases.

Authority Liaison GCS continuously liaised with the DME, keeping all relevant personnel updated on progress and following their feedback. The project has been outlined to the DME during an introductory meeting at DCM on  $3^{rd}$  of October 2007 and subsequent Scoping Meetings on the  $1^{st}$  of Movember 2007. On the  $6^{th}$  of December 2007, an authorities meeting was held with MDALA, at DCM.

Notifications

the project and any additional information. The areas included (the entrance to the DCM, TNC Village, Various site notices were place in the area during two stages of the project to notify all stakeholders of

Citizen, The Ridge Times and Witbank News on four (4) separate occasions (October 2007, January 2008, Advertisements regarding the project in terms of the required legislated procedures were placed in the Thubelihle Village, Ga-Nala Municipal Offices, and Clinic in Ga-Nala.

responses by fax, telephone or e-mail to GCS. contact details and a comment/registration sheet. I&APs/Stakeholders were invited to register and send projects as well as the EIA and draft EMP purpose, requirements and process. It also included relevant and/or post by GCS. The BIDs was made available in English. The BIDs included details of the proposed Background Information Documents (BIDs) were distributed to all IEAPs/Stakeholders via e-mail, fax February 2008 and April 2008).

were noted, and will be commented on the EIA and draft EMP. discussed. Any issues or concerns raised by the members of the public regarding the Expansion Project Project was explained in detail and the Environmental Assessment Process in terms of the MPRDA was The Public Scoping meeting was held on the 1st of Movember 2007 at Hoërskool Kriel. The Expansion Stakeholder/Public Scoping Meeting

A follow up Focus Group Meeting were organised by TCSA at DCM on the  $6^{th}$  of December 2007. The

and the listed activity process. All issues and concerns raised by the members of the public will be A Second Public Scoping meeting was held on the 1st of February 2008 at Hoërskool Kriel in terms of NEMA surrounding farmers were invited to the meeting.

Ongoing telephonic consultations have been undertaken throughout the Scoping EIA and EMP Phases. The open day feedback meeting has been held on 18 April 2008 at the Kriel Collieries Golf Club. commented on in the EIA and draft EMP.

main concerns in this regard had been, but are not limited to the following: have been noted and were incorporated within the detailed investigations of the EIA and EMP phase. The to raise their concerns with regards to the proposed project. All comments and/or concerns received open and transparent channel of communication. All stakeholders and I&APs were given the opportunity Ongoing communication (i.e. telephonic, meetings, emails, fax etc.) has been undertaken to ensure an Issues and Responses Document

- Impact on land value;
- Impact on the farms and what the purchasing options are (where applicable);
- Impact on the farms where mining infrastructure is planned over farm portions and/or over existing
- Impact on infrastructure as a result of blasting activities; infrastructure (i.e. railway line);
- Impact on water quality;
- facility and other mining activities; and Impact on the surrounding watercourses and wetlands due to the establishment of the co-disposal
- Impact on the farms due to the scheduling of the opencast operations.

#### Management Measures

Geology

Main Management Measures

The following management measures were identified, and include but are not limited to the following

which should be undertaken:

The mining operations should be limited to the mining area; Management measures (i.e. stabilising poles) should be incorporated into the underground mining design

At the TMC defunct workings the abstraction of groundwater should be lower than the recharge of the

aquifer (a 25% roof height should be kept).

to limit the potential of subsidence; and

Topography

Main Management Measures

Management measures identified include but are not limited to the following which should be

undertaken:

All activities must remain within the dedicated footprints of the infrastructure within the mining area; The construction activities will be undertaken in such a way as to ensure that the area after construction

is free draining (ensure effective run off from natural precipitation);

Slope angles of stockpiles and dumps are not to exceed 18°;

Where possible the extension and expansion of the railway lines and other linear infrastructure should

follow the route of the contours of the area to limit cut and fill; and

The permanent infrastructure such as the co-disposal facility must be designed with the aim on closure

ensuring stability and rehabilitation potential.

Soils, Land Use and Capability

Main Management Measures

Management measures identified include but are not limited to the following which should be

undertaken:

Topsoil will be stripped to 400mm depth or up until hard rock is reached. This overburden will be

stockpiled on designated areas which are clearly identifiable;

Prior to the removal of the soils for stockpiling additional sampling and analysis of the soils must be undertaken, to determine their suitability for use during rehabilitation. This is necessary to ensure that

the possible loss of nutrients from the soils during stockpiling is considered;

Effective erosion control measures will be implemented;

The mine will ensure that equipment movement over the stockpiles will be limited to avoid soil

combaction and subsequent damage to soil structure or the seed bank; and

Clean and dirty water systems (also the containment of any contaminants) will be implemented to reduce

the potential of soil contamination.

Ecology

**WPRDA EMP** 

Main Management Measures

Management measures identified include but are not limited to the following which should be

undertaken:

Construction activities should be limited to the designated areas, where possible as little as possible

vegetation should be removed;

Dorstfontein Coal Mine - East Mine Expansion Project

are required where grass is to be planted on soils that are leached out or eroded, containing a low

organic matter content. Add minimum recommended amounts of fertilizer to get successful Main grass species will be reintroduced in disturbed areas after fertilization has been added. Fertilizers

establishment and good coverage of the grass to bind soils. The need for fertilizer will be determined by

Should any rare or endangered species be found within the Expansion Project area will they be relocated the recommendations of the specialist soil study;

under the guidance of MDALA;

The potential for dust will be kept to a minimum;

Due to the activities during construction the amount of people will increase, this could lead to a

potential for poaching and hunting of animals on site. Fines will be implemented for poaching and

hunting of animals; and

updated of all new issues. All employees will be made aware of all environmental issues during induction, and must continuously be

Wetlands

Management measures identified include but are not limited to the following which should be Main Management Measures

All wetlands must be clearly demarcated and all construction servitudes should be located outside the nuqertaken:

wetland areas, where possible;

all areas devoid of vegetation must be ploughed and re-vegetated with a suitable mix of indigenous plant vegetated by a suitable mix of plant species as determined by a qualified botanist. After construction, Where servitudes do intrude into the wetlands these areas will need to be ripped. The area must be re-

Where this is not practically possible, sufficient culverts should be placed along the crossing to ensure Where possible the railway line should cross all wetland and rivers perpendicular to the direction of flow. species as determined by a qualified botanist;

Erosion control measures must be implemented and maintained. Where possible storm water should be flows remain spread across the width of the wetland;

conveyed through grassed swales, rather than concrete channels to aid infiltration and reduce run off

Opencast operations should remain within the authorised boundaries of the mining operations; structures should include measures to dissipate energy of flows and to disperse flows over a greater area; should be done in consultation with an appropriate wetland and storm water specialist. The gabion Should storm water be discharged into wetlands, gabions should be constructed to contain erosion (this səwnjon.

A low berm, approximately im high by 2-3m wide must be established prior to the commencement of opencast operations, between the opencast workings and the valley bottom wetlands, and where possible outside the wetland boundary, to intercept flows containing suspended soils and create a depositional

environment; Water diverted around the opencast mines should be released in such a manner as to aid dispersion

across most of the width of the downstream wetlands; and

Surface Water

Main Management Measures

the potential of erosion, siltation and compaction.

Management measures identified include but are not limited to the following which should be

nuqertaken:

Clean and dirty water systems should be implemented prior to the commencement of construction

activities and must be designed for a 1 in 50 year storm event;

Negetation establishment in disturbed areas will be undertaken as soon as practically possible to reduce

to potential of erosion and associated siltation. Where disturbed areas cannot be re-vegetated during

the life of operations appropriate erosion control measures (i.e. dust allying agent terraces rock

the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock

cladding, etc.) must be implemented. The mine will ensure that all erosion controls are included in the

designs of all linear infrastructure and points of water discharge. Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness;

All activities must remain within the dedicated footprints of the infrastructure within the mining area;

No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken

outside of an effectively designed contained area. All hydrocarbons and other chemicals should be stored in bunded area with a capacity of 110% of the volume stored within;

A spill contingency plan should be available and enforced. Major spillage incidents will be reported to

the DME, DWAF, MDALA and the Department of Agriculture;

A detailed waste management strategy will be established and implemented; and

All employees will be made aware of all environmental issues during induction, and must continuously be

updated of all new issues. Mitigation measures and operational procedures in case of any environmental

emergency must be communicated.

Groundwater

Main Management Measures

Management measures identified include but are not limited to the following which should be

undertaken:

Ongoing groundwater monitoring in terms of water levels and quality will be undertaken prior to the

construction activities and throughout the life of mine;

The pollution control dams will be lined to reduce the potential of dirty water seeping to the

groundwater;

MPRDA EMP

Should the mine impact on the groundwater and if this has been determined by an external and

Dorztfontein Coal Mine - East Mine Expansion Project

independent groundwater specialist, the mine will negotiate with the farmer to provide the farmer with

utilisation of the existing pollution control dams (depending on the capacity), the implementation of a Studies will be undertaken to determine how the decant will be managed. This could include the water; and

wetland treatment programme, the establishment of a water treatment plant or the planning of trees

which have the capability to withdraw the polluted water.

AsioN

Main Management Measures

Management measures identified include but are not limited to the following which should be

Equipment with lower sound power levels will be selected and suitable mufflers must be installed on undertaken:

Acoustic enclosures for equipment causing radiating noise will be installed; engine exhausts and compressor components;

The scheduling of equipment within the opencast pits must take into consideration the noise emissions

possible. Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance During the design operations make use of the natural topography of the area as a noise buffer where from the equipment in order to spread tem out over the interface area;

All digging faces on the eastern and western side of the mine must have alternate overburden dumps or and natural shielding where necessary;

nuacceptable levels; other means of attenuating the noise, which can be activated should the noise levels approach

pue Limit the hours of operation for specific equipment and mobile sources with high sound power outputs;

Develop a mechanism to record and respond to all complaints. Open channel of communication should be established by the mine with the surrounding landowners.

Management measures identified include but are not limited to the following which should be Main Management Measures Visual

To restore the visual quality of the landscape, it is suggested that a comprehensive rehabilitation plan be

developed, based on the principles of ecological restoration;

Light pollution will be seriously and carefully considered and kept to a minimum wherever possible as

light at night travels great distances;

landscape by contrasting with existing natural topographic forms and because it is difficult to sustain Harsh, steep engineered slopes will be avoided as these could impose an additional impact on the

Visual barriers (i.e. indigenous trees) could be planted to reduce the visual impact on surrounding areas; vegetation on steep slopes in the long term;

Avoid construction material with bright colours with high reflection values. Grey to olive green colours in guq

a matt finish contribute to the assimilation of features with natural backgrounds.

Archaeological Status

Management measures identified include but are not limited to the following which should be Main Management Measures

undertaken:

The mine will remain responsible for their future unaffected existence and maintenance. Controlled If the grave yards can be preserved in situ, they must be demarcated with brick walls or with fences.

remains have to be obtained from the descendants of the deceased (if known), the National Department If graveyards must be exhumed and relocated permission for the exhumation and relocation of human access to these graved must exist for any relative or friends; and

of Health, the Provincial Department of Health, the Premier of the Province and the local police. The

necessary permits and/or authorisations must be obtained from the SAHRA.

Air Quality

Management measures identified include but are not limited to the following which should be Main Management Measures

Ongoing ambient and PM10 monitoring must be implemented with dust monitors concentrated to the

wets of the site;

Effective dust management practices should be employed (dust allaying products, etc.);

When any burning areas within a stockpile or dump or the mining area may develop the area will be A dust management plan must be implemented on the mine; and

excavated and re-compacted immediately.

Vibration

Main Management Measures

Management measures identified include but are not limited to the following which should be

undertaken:

Surrounding property owners will be informed of the blasting procedures and schedules;

An exclusion zone of 500m will be in place for the life of mine, it this in not possible the necessary

approvals will be applied for;

Blasting boards, at the access routes to construction areas, will be updated 24 hours prior to the blast, Scheduled blasting times will be planned in advance and will be clearly indicated on the mining area.

under acceptable levels (see Blasting specialist report); The mine will undertake monthly blasting monitoring to determine whether the blasting activities remain displaying time and date of blast;

implemented in order to establish whether any potential impact could result due to the blasting indicate it necessary (vibrations above or on impact level), permanent monitoring stations will be The mine will implement a temporary testing model during initial blasting phase. Should the results

activities. The areas of most influence as identified by the temporary seismic monitoring stations will be

in crack width and those produced by habitation and ground motion-induced vibrations; and owners. These monitors employ a single sensor that measures both weather-induced micrometer changes Installation of electronic crack monitors will also be undertaken if it is requested by surrounding property equipped with permanent seismic monitoring stations;

The mine will establish an open channel of communication in order to ensure that all issues and concerns

Socio-Economic Conditions

Management measures identified include but are not limited to the following which should be Main Management Measures

The use of local labour should be maximised to limit the negative impact on the existing infrastructure, undertaken:

Municipality to ensure that the additional requirements for the population increase can be met over Housing and other infrastructural needs should pro-actively be discussed with the Emalahleni Local services and resources;

Implement education and skills development programmes to ensure an effective skills match between

local people and mine requirements;

Focus on also creating employment opportunities for the youth and women;

Ensure safe and secure public transport access points;

Ensure effective safety and security measures;

are known and are addressed.

local people and mine requirements (seeing as the proposed mine is an open cast mine, whilst the labour Implement education and skills development programmes to ensure an effective skills match between Maximise the usage of local service providers and use local workforce;

mining company (TCSA DCM), Emalahleni Local Municipality, community leaders and landowners to Possible establishment of a Management and Monitoring Committee consisting of representatives of the Ongoing and transparent communication with community leaders, landowners and spokespersons; and Mining company should strive to achieve best practice Guidelines of EMP should be strictly followed; force has experience on underground mining);

monitor mining activities over the long term.

DCW:

The following gaps have been identified as the environmental investigations, and should be addressed by Main Gaps Identified

Abstraction of groundwater and recharge of the aquifer at old TNC de-funct mine and other changes in this regard with the relevant authorities and submit the necessary documentation. regulatory route with regards to environmental authorisation, and is committed to discuss any potential in a change in the preferred site in the near future. However DCM is committed to follow the required be far less viable than Option 1. Currently further studies are being done in this regard, and could result Although option 5 was chosen as the preferred site, economic indications have shown that Option 5 will Railway line site selection (Option 5 vs. Option 1) .1

monitoring data is available (1 year from now). the long-term groundwater and decant quality. The numerical model should be updated once more this should be re-assessed. Leach tests should be performed once ore material is available to characterise Once the IGS study into the seepage rates into TMC underground workings is completed the impact from management measures.

conceptual designs. Given the capacity of the pollution control dams for the expansion project and the Currently the compartmentalisation of pollution control dams have not been allowed for in the the area of DCM, this option is not accepted by DWAF, and a liner of HDPE (1.5mm) is proposed. The feasibility report proposed the lining of pollution control dams with bentonite, from experience in Dirty water infrastructure design .ε

threat ito water supply to the plant and other areas should the current conceptual design dams be silted compartmentalised to manage the potential siltation of the proposed dams. Siltation could lead to a associated philosophy to reuse water in the processing, it is recommended that the dams will be

experience at the DCM mine. In addition to the above it is recommended that all dirty water drains and stockpiles be lined as per up and require maintenance.

During the feasibility stage undertaken by the project team, various designs have been proposed. The Decanting .4

construction and operational phases; these dams have however not made provision for the volumes of The proposed return and storm water dams have been designed to contain any water during the following has reference to these:

The option to utilised these dams to cater for the decant volumes must be investigation, however, decanting during the decommissioning phase.

be viable as the evaporation rates for this area exceeds rainfall and will also exceed the decant volumes. plant species to withdraw water, and/or the establishment of evaporation ponds. The last option might Salix mucronata (Natal Willow), Ficus sp. Salix subserrata (Safsaf Willow) or any other endemic tree or water treatment plant, and/or the planting of Combretum erthrophyllum (River bushwillow), Ficus sp. Should this not be possible other options may include wetland treatment, and/or the establishment of a further studies need to be undertaken in this regard.

urgency.

The decant quality simulation has not been undertaken, it is recommended that once the information is

available this be assessed and documented As the above has not been included within the financial provision for the Expansion Project.

5. Surface Right Ownership

The agreements between TCSA and the farmes owning surface rights within the proposed project area has not been finalised. The applicant are aware that these need to be undertaken as a matter of

6. Further studies

During the open day held on 18 April 2008, further investigations into the migratory routes of birds in the area, as well as the status of amphibians in the wetlands were brought up. These studies will be discussed and should it be required will be undertaken and included into the final EIA and EMP.



#### CONTENTS PAGE

3-59	3.1.4 Ecology (Fauna and Flora)
3-5	zlio2 E.f.E
£-£	3.1.2 Topography
Z-E	3.1.1 Geology
Z-E	3.1 Construction Phase
1-5	3 MANAGEMENT MEASURES
<b>Z-2</b>	2.2.9 Coal Product Supply
g-Z	2.2.8 Co-Disposal Facility
9-6	2.2.7 Plant and Related Infrastructure
7-7	2.2.2 Aining Related Infrastructure
7-7	
2-3	153
2-3	2.2.4 Domestic and Hazardous Waste Generation
2-3	2.2.3 Contractors Lay Down Area
7-7	2.2.2 Borrow Pits
7-7	2.2.1 Establishment of Infrastructure
7-7	2.2 Environmental Management Objectives
1-7	λ.1 Activities
1-2	2 ACTIVITIES AND ENVIRONMENTAL MANAGEMENT OBJECTIVES
6-1	1.6 Report Structure
8-1	1.5.3 EMP Process
Z-1	1.5.2 Environmental Process Objectives
Z-1	1.3.1 Legislation
9-1	1.5 Methodology
9-1	1.4 Brief Description of Public Participation Process
<b>b-</b> L	1.3 Description of Land
1-1	1.2 Brief Project Description
1-1	1.1 Introduction
1-1	1 BACKGROUND AND INTRODUCTION
IIAX	LIST OF APPENDICES
IIAX	LIST OF TABLES
IIAX	LIST OF FIGURES
ΛX	CONTENTS PAGE
Ш	EXECUTIVE SUMMARY

l-9	VIRONMENTAL AWARENESS PLAN	9 EN
£- <b>S</b>	Emergencies, Procedures and Remedial Action	Z.1.2
Z-G		1.1.2
1-9	What is an Environmental Emergency Response Plan?	1.2
г-г ио <b>ІТ</b> А	OCEDURE FOR ENVIRONMENTAL RELATED EMERGENCIES AND REMEDIA	94 С
01-4	Periodic Mine Environmental Audit	d.5
8-4	Blasting and Vibration	1.4.4
8-4	Noise Surveys	
<b>7-</b> Þ	Soil and Vegetation Monitoring	2 5.4
9-4		4.2.2
9-₽	Monitoom	1.2.4
9-1⁄2	Dust Monitoring	1 2.4
<b>G-</b> ₹		£.1.₽
£- <del>Þ</del>	Groundwater Monitoring	
l-b	Water Monitoring Surface Water Monitoring	1,1,4 1,1,4
l- <del>Þ</del>	Water Monitoring	\
r-4	DNITORING AND MANAGEMENT PROGRAMME	ow Þ
121-8	Final rehabilitation	3.5.5
3-146		<b>₽.</b> £.£
3-146	Rehabilitated residue deposits	£.E.E
8 <del>1</del> 1-5	Water pollution control structures	2.5.5
741-E	Rehabilitated land	1.5.5
741-E	Secommissioning and Closure Phase	3 5.5
3-160		21.2.E 51.2.E
3-123		11.2.8
3-120		3.2.10
541-E 741-E	Site of Historical and Cultural Importance	9.2.5
751-5	Air quality	8.2.8
3-122	Wetlands	7.2.5
3-119	Groundwater	3.2.6
3-111	Surface Water	3.2.5
3-101	Ετοιοgy	4.2.8
£Υ-£	Soils Land Use and Land Capability	5.2.5
17-5	Торовгарћу	2.2.2
0 <b>∠-</b> ε	Geology	1.2.8
3-70	Operational Phase	0 S.E
3-26		£1.1.E
3-54		21.1.2
3-21		11.1.5
6Þ-£		9.1.E 01.1.E
74-E	Air Quality Sites of Historical and Cultural Importance	8.1.8
3-45	Wetlands	7.1.E
3-41	Groundwater	3.1.E
10-0	эптасе магет	

01-01	Appendix B: Closure cost - Report
6-01 SONATANDON ROSNAM SANOTS	Appendix A: Environmental Awareness Plan
0	appendices
<b>≯-</b> L	Table 7.1.: Master Rates Utilised
£-9	Table 5.1: Safety and Health Contact Numbers
€-4	Table 4-3: Groundwater parameters
↓->	Table 4.2: Surface Water Parameters to be monitored
<b>↓-</b> <del>♭</del>	Table 4.1: Surface Water Monitoring Points
	LIST OF TABLES
€-Þ	Figure 4.1: Surface Water Monitoring Locations
£-1	Figure 1.1: DCM Location Map
	LIST OF FIGURES
1-01	10 REFERENCES
l-6	6 СОИСТПЗІОИ
1-8	8 UNDERTAKING BY CLIENT
L-L L-L	7.2 Cost Estimate Summary 7.2.7 Provision of the Funds
7-Z 1-Z	7.1 Method for Financial Provision 7.1.1 Background of the Financial Provision 7.1.2 Methodology
<b>1-∠</b>	7 FINANCIAL PROVISION FOR CLOSURE

#### 1 BACKGROUND AND INTRODUCTION

#### 1.1 Introduction

Dorstfontein Coal Mines (DCM) is owned by Total Coal South Africa (TCSA) (74%) and Mmakau Mining (26%), its Black Economic Empowerment Partner.

The mine is an outsourced operation with underground mining and coal processing conducted by

contractors and with TCSA retaining general management and marketing control. DCM (comprising the existing West Mine and proposed East Mine), is situated on portions of the farms

Dorstfontein 7115, Boschkrans 5315, Fentonia 54 IS, Rietkuil 5815 and Welstand 5515, located within the

Emalahleni Local Council, Mpumalanga. The current operation lies directly north-east of the town of Ga-Nala (Kriel) (Figure 1.1).

DCM is in a joint venture (JV) with Xstrata Coal. The JV has an arrangement with RBCT to supply the

terminal with 2 million tons per annum (mtpa) of coal for export.

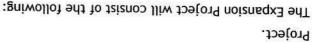
The DCM mining operation has an approved Environmental Management Programme (EMP) 2005, for the

underground mining of the No. 2 and No. 4 coal seam and a pending EMP amendment for the establishment of a bulk sample on the existing mine (West Mine), which will serve to determine the

quality and grade of the No. 4 Seam.

#### 1.2 Brief Project Description

The JV between TCSA and Xstrata will terminate in December 2009, which will make DCM responsible to fulfil the 2 million tons per annum (mtpa) RBCT entitlement. The additional coal supply requirement will necessitate the expansion of the current DCM activities and will be referred to as the DCM Expansion



- New plant and associated infrastructure;
- Opencast operations;
- Expansion of the underground operations;
- Co-disposal facility;
- Transportation (i.e. roads and conveyors);
- Mater supply;
- Sewerage treatment;
- Railway line and associated power requirements to transport coal to the RBCT; and

Pipeline transporting water from the old TMC mine to the plant.
 DCM is currently mining the Mo. 3 coal seam (and bas apprecial to mine).

DCM is currently mining the No. 2 coal seam (and has approval to mine the No. 4 seam) via underground

mining operations on the western portion of the mining rights area. The expansion project will necessitate the inclusion of the extensive No. 4 coal seam overlying the No. 2 coal seam, which has been identified as the preferred resource to ensure a production profile of 2mtpa. In

addition to this the No. 1, 3 and 5 coal seams will be mined. All resources less than 40m deep will be accessed via the opencast operations, whereas the deeper lying coal will be accessed via underground

mining operations.

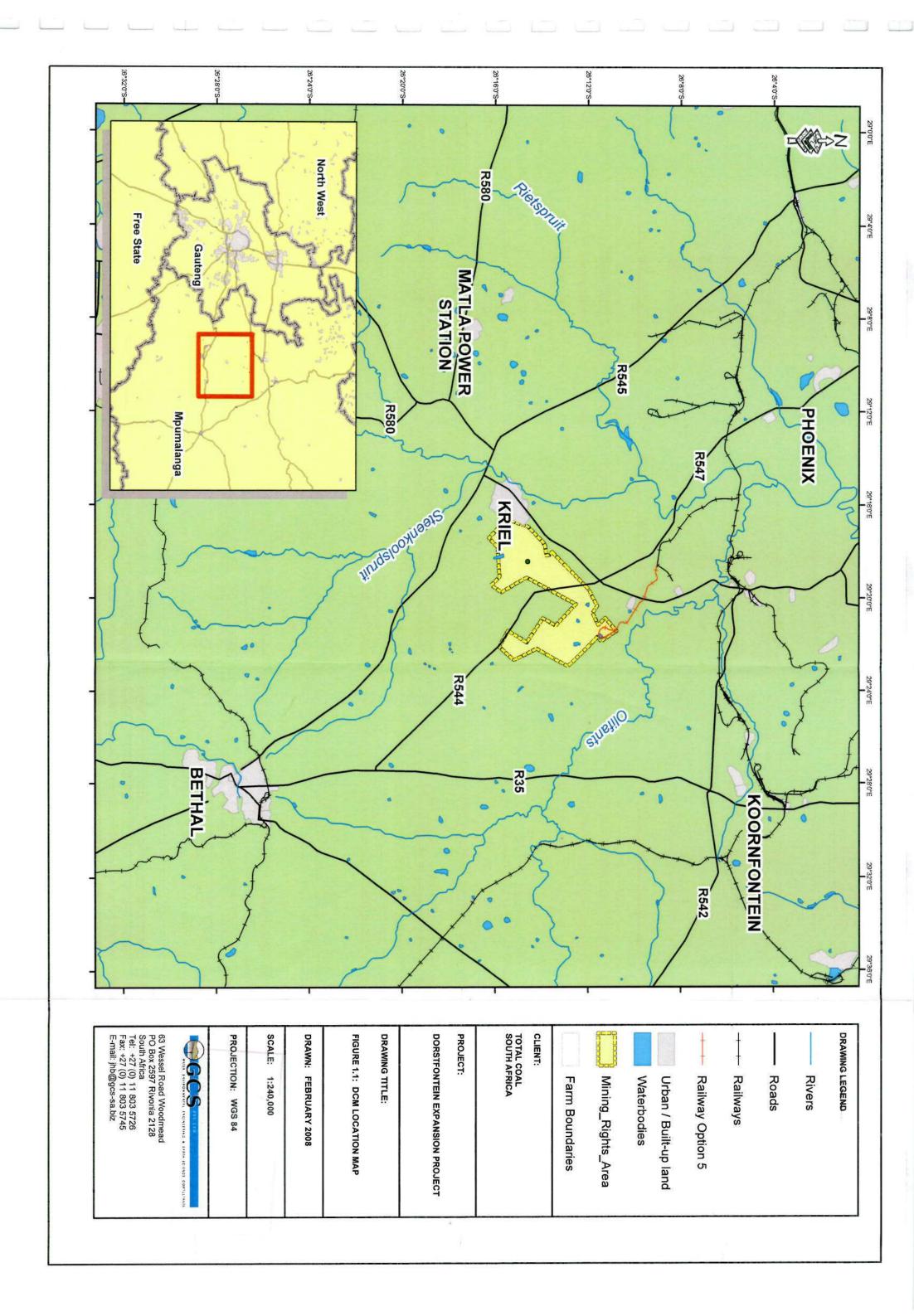
Construction activities are planned to commence during end 2008, being in full production in 2010. Initial coal production is planned from opencast operations at the East Mine (PIT 1 and PIT 2). The opencast production rate has been determined at a constant rate of 3mtpa of Run of Mine (RoM) for the first six (6) production rate has been determined at a constant rate of 3mtpa of Run of Mine (RoM) for the first six (6) to seven (7) years of the Expansion Project, which equates to an overall coal extraction of 21 million tons to seven (7) years of the Expansion Project, which equates to an overall coal extraction of 21 million tons RoM.

During year 6 the project will ramp up to 2.94mtpa. Underground production will commence from the opencast high walls on No. 4 and No. 2 seams on the East Mine and is planned at 2.52mtpa RoM. This will be supplemented by 420ktpa from the remaining reserves of the opencast blocks on the East Mine. RoM from the opencast pits will be transported via conveyors to the plant observed from the plant to a new co-disposal facility by conveyor for the coarse fraction Discard will be conveyed from the plant to a new co-disposal facility by conveyor for the coarse fraction

Discard will be conveyed from the plant to a new co-disposal facility by conveyor for the coarse fraction and by pipeline for the slurry fraction at a rate of approximately 205 tons per hour (tph). The co-disposal facility will be designed to hold 2.9 million tons of slurry within an outer wall of 33.1 million tons of coarse discard over the life of mine (LoM). The project will ensure a LoM in excess of 25 years. All new infrastructure with the exception of the proposed railway line will be situated within the existing previous TMC railway line with some sections requiring extension and expansion. Coal will be transported from the plant via conveyor to a rapid load out facility from where the train wagons will be loaded to transport the coal to the RBCT. The new rapid load-out facility associated with the new railway line will be required to be in close proximity to the plant to link to the RBCT coal line to the north of the project area. The railway line is proposed to pass through portions of the following farms: Vandyksdrift 1915, area. The railway line is proposed to pass through portions of the following farms: Vandyksdrift 1915, area. The railway line is proposed to pass through portions of the following farms: Vandyksdrift 1915, area. The railway line is proposed to pass through portions of the following farms: Vandyksdrift 1915, area. The railway line is proposed to pass through portions of the following farms: Vandyksdrift 1915, area.

Welstand 5515, Clydesdale 48315 and Vaalkranz 2915.





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#### 1.3 Description of Land

The DCM environmental investigation and reporting addresses the total authorised mining area, which includes portions of the farms Dorstfontein 71 IS, Boschkrans 53 IS, Fentonia 54 IS, Rietkuil 58 IS and Welstand 55 IS, as well as the areas on which the railway line and water supply pipeline will be established (refer to Table 1.1).

TCSA currently owns all of the surface rights overlying the mineral rights. However, due to surface limitations, particularly in the eastern reserve block and in the area earmarked for the plant and the rail loop, additional surface rights (servitudes) need to be considered to implement the mine layout proposed. TCSA owns all the mineral rights under consideration in the project having successfully transferred the rights from "old order" to "new order" under the requirements of the MPRDA.

Table 1.1: Title deed description of farm names and portions under the whole Expansion Project, including the railway line

rtion	Name of Owner	Title Deeds	Name of Farm	Surveyor-general Digita (SGD)
W DNITS	ining Right Boundaries	FAMERANCE		College Branch
-	Dorstfontein Coal Mines (Pty) Ltd	T26261/2004	Boschkrans 53 IS	T0IS0000000005300012
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	T0IS0000000000110T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	T0IS0000000000010T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	►0000170000000000210T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	Z00001700000000000210T
area 2)	HJ Pieterse Vlakfontein Tweehonderd	121784/1999	Dorstfontein 71 IS	300001700000000002I0T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	T000001700000000000210T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	80000170000000000210T
	Bakenlaagte Trust (Mr. E.M. Muller)	T66129/2007	Fentonia 54 IS	T0IS00000000005400000
	Bakenlaagte Trust (Mr. E.M. Muller)	T66129/2007	Fentonia 54 IS	T0IS00000000005400002
	Bakenlaagte Trust (Mr. E.M. Muller)	T66129/2007	Fentonia 54 IS	T0IS0000000005400003
	Dorstfontein Coal Mines (Pty) Ltd	±26260/2004	Rietkuil 57 IS	T0IS0000000055800005
	No fonger Exists	DU1000/800	Welstand 55 IS	T0IS00000000005500000
<b>b</b>	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	<b>→0000220000000000010</b> T
S	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
lway line				
	Ingwe Surface Holdings Ltd	4661/9 <del>5</del> 997T	Van Dyk Drift 19 IS	F0000010000000000000000
	Transnet Ltd	T23210/1963	Van Dyk Drift 19 IS	90000610000000000SIOT
	Oostraland Boerdery Pty Ltd	T29304/1983	Steenkoolspruit 18 IS	F00000810000000000000010T
	Phoenix Colliery Ltd	T110494/1992	Kromfontein 30 IS	T0IS00000000003000002
	Republiek van Suide Afrika	T23451/1989	Kromfontein 30 IS	T0IS00000000003000029
	Middledrift 42 Eiendomme Pty Ltd T36355/200		Kromfontein 30 IS	T E000000000000000000010T
	Middeldrift 42 Eiendomme Pty Ltd	T36355/2000	Middeldrift 42 IS	T0IS00000000004200000
	Diepspruit 41 Eiendomme Pty Ltd	T36354/2000	Middeldrift 42 IS	T0IS00000000004200002

#### 1.4 Brief Description of Public Participation Process

The Public Participation Process (PPP) is a requirement of the EIA and EMP process and ensures that all relevant IBAPs are consulted and involved. The process ensures that all stakeholders have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures for a complete comprehensive environmental study.

A comprehensive PPP was initiated at an early stage in both Scoping Phases (NEMA and MPRDA) in order for the concerns of I&APs, authorities and the wider public to be recognised and understood. The PPP has

been an ongoing process undertaken throughout the EIA and EMP.

GCS is continuously liaising with DME, keeping all relevant personnel updated on progress and following the advice from DME. The project has been outlined to DME through mostings between CCS and following

the advice from DME. The project has been outlined to DME through meetings between GCS and DME, with an introductory meeting at DCM on 3<sup>rd</sup> of October 2007.

The Scoping Authorities meeting took place on the 4<sup>st</sup> of Movember 2007.

The Scoping Authorities meeting took place on the 1<sup>st</sup> of November 2007. On the 6<sup>th</sup> of December 2007, and December 2007, and December 2007, on the 6<sup>th</sup> of December 2007, on the 6<sup>th</sup> of December 2007, and December 2007, on the 6<sup>th</sup> of December 2007, and December 2007, on the 6<sup>th</sup> of December 2007, on the 6<sup>th</sup> of December 2007, or th

consulted were identified from authorities that have dealt with DCM in the past.

The existing list of I&APs/Stakeholders from DCM has been updated by GCS through information received in response to the press advertisements and notices. The site notices were placed during the consultation phase to inform the stakeholders about the first public meeting. TCSA, with GCS, has in addition continued in discussions with surrounding landowners who were also included into the database. Background Information Documents (BIDs) were distributed to all I&APs/Stakeholders via e-mail, fax and/or nost. The BIDs were made available in Earlish

and/or post. The BIDs was made available in English.

Ongoing communication (i.e. telephonic, meetings, emails, fax etc.) has been undertaken to ensure an open and transparent channel of communication. All stakeholders and I&APs were given the opportunity to raise their concerns with regards to the proposed project. All comments and/or concerns received have been noted and are incorporated within the detailed investigations of the EIA and EMP phase (see Section

#### 1.5 Methodology

5 in EIA).

TCSA DCM appointed GCS (Pty) Ltd to undertake the necessary environmental assessments and to ensure that all legislative requirements are adhered to as part of the environmental authorisation process. In terms of Section 39 (1) of the MPRDA, DCM are required to conduct an environmental assessment and submit an EIA/EMP to the DME, in respect of any new operations and/or expansions of the mine as explained in Section 1.2.

The DCM environmental investigation and reporting will address the total Expansion Project Area. Conducting the required environmental reporting according to the MPRDA involved the compilation of an Environmental Scoping Report (ESR) that has been submitted to the DME, and the EIA/EMP of which this report is part of. The EIA/EMP is submitted as a combined document to the stakeholders for comments.

#### Legislation 1.2.1

following Legislation (and the Regulations promulgated hereunder): The environmental component of the project will comply with the requirements of inter alia, the

- Constitution of South Africa, 1996 (Act 108 of 1996);
- The Mineral and Petroleum Resources Development Act (Act 28 of 2002);
- The National Environmental Management Act, 1998 (Act 107 of 1998);
- The National Water Act, 1998 (Act 36 of 1998);
- The Environment Conservation Act, 1989 (Act 73 of 1989);
- The Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965);
- The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004);
- The Hazardous Substances Act, 1973 (Act 15 of 1973); and
- The National Heritage Resources Act, 1999 (Act 25 of 1999).

#### 1.5.2 Environmental Process Objectives

Operation phase; and Construction phase;

:aut

identify issues of concern and to thoroughly investigate these issues. The environmental investigations the project environmentally unacceptable, GCS have adopted an integrated, step-by-step process to In order to mitigate potentially negative impacts and to identify any potential fatal flaws that may render

undertaken addressed all phases related to the proposed expansion of the mine. These phases included

Closure and decommissioning phase.

that the positive impacts are maximised, the environmental study are to meet the following aims: To ensure that the negative impacts are identified and mitigated in the early stages of the project, and

- Follow the guideline process as outlined by the MPRDA;
- Provide input in the feasibility phases to ensure that the most technically feasible, and
- Ensure that impacts are identified early through investigations to minimise environmental damage and environmentally sound options are selected;
- Conduct thorough special investigations that will allow the project team to develop an adequate maximise benefits;
- Compile an EIA that will identify, evaluate and address the potential impacts; understanding of the issues to be dealt with;
- Provide ongoing environmental input into the project planning and development;
- Compile an EMP that will limit the significance of the negative impacts and maximise the positive
- Ensure that all relevant I&APs / Stakeholders are consulted and involved throughout the project;

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rtion	Name of Owner	Title Deeds	Name of Farm	Surveyor-general Digits (SGD)
м эиітгі	lining Right Boundaries	Marine Marine		WE THEN BE THE TOTAL TO
	Dorstfontein Coal Mines (Pty) Ltd	T26261/2004	Boschkrans 53 IS	T0I200000000002300012
	Dorstfontein Coal Mines (Pty) Ltd	±26263/2004	Dorstfontein 71 IS	Z0000170000000000210T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	T0IS000000000010T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	≯0000170000000000210T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	T0IS00000000007100005
area 2)	HJ Pieterse Vlakfontein Tweehonderd	44/1999	Dorstfontein 71 IS	40000170000000000210T
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	T015000000000007
	Dorstfontein Coal Mines (Pty) Ltd	T26263/2004	Dorstfontein 71 IS	8000017000000000210T
	Bakenlaagte Trust (Mr. E.M. Muller)	Z007/671991	Fentonia 54 IS	T0IS0000000005400001
	Bakenlaagte Trust (Mr. E.M. Muller)	T66129/2007	Fentonia 54 IS	T0IS0000000005400002
	Bakenlaagte Trust (Mr. E.M. Muller) T66129/2007		Fentonia 54 IS	T0IS00000000005400003
	Dorstfontein Coal Mines (Pty) Ltd T26260/20		Rietkuil 57 IS	T0IS0000000055800005
	No longer Exists	DU1000/800	Welstand 55 IS	T0IS00000000005500000
Þ	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS0000000005500004
S	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS0000000000510T
	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
	Dorstfontein Coal Mines (Pty) Ltd	T26262/2004	Welstand 55 IS	T0IS00000000005I0T
lway line				经国际公司 医克莱特氏
	Ingwe Surface Holdings Ltd	6661/9 <del>5</del> 297T	Van Dyk Drift 19 IS	1000009100000000002IOT
	Transnet Ltd	T23210/1963	Van Dyk Drift 19 IS	90000610000000000SIOT
	Oostraland Boerdery Pty Ltd	T29304/1983	Steenkoolspruit 18 IS	T0IS00000000010T
	Phoenix Colliery Ltd	T110494/1992	Kromfontein 30 IS	T0IS00000000003000002
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Surveyor-general Dig	Mame of Farm	Title Deeds	Name of Owner	ortion
T0IS00000000042000	Middeldrift 42 IS	T27624/1988	Republiek van Suide Afrika	
T0IS00000000042000	Middeldrift 42 IS	Ingwe Surface Holdings Ltd T52913/2001		SI
T0ISO0000000043000	Rietfontein 43 IS	Eyesizwe Coal (Pty) Ltd T47039/2003		(
T0150000000000430000	Rietfontein 43 IS	T36355/2000	Middledrift 42 Eiendomme Pty Ltd T363	
T0ISO00000000430000	Rietfontein 43 IS	T47038/2003	Eyesizwe Coal (Pty) Ltd	
T0IS000000000430000	Rietfontein 43 IS	T57180/2001	Kanivest 3159 CC	
T015000000004720000	Lourens 472 IS	T25747/1982	L25747/198	
T0IS000000000450000	Vlaklaagte 45 IS	1661/609S9T	B H P Billiton Energy Coal South Africa T65609/1991	
T0IS00000000045000	Vlaklaagte 45 IS	B H P Billiton Energy Coal South Africa Ltd		6
T01S00000000045000	Vlaklaagte 45 IS	1661/609S9T	B H P Billiton Energy Coal South Africa T65609/1991	
T0IS000000000550000	Welstand 55 IS	9761\2918T	Alnietel Pty Ltd	
T0IS000000000550000	Welstand 55 IS	9761\2918T	Alnietel Pty Ltd	
T0IS000000004830000	Clydesdale 483 IS	T47034/2003	Eyesizwe Coal (Pty) Ltd	
T015000000000029000	Vaalkranz 29 IS	T47036/2003	Eyesizwe Coal (Pty) Ltd	S
			oly pipeline	Vater supp
T0IS000000000550000	Welstand 55 IS	9761\2918T	Alnietel Pty Ltd	
T0IS000000000550000	Welstand 55 IS	9791\2918T	Alnietel Pty Ltd	

The mine will enter into the necessary purchase agreements with surface right owners where applicable.

#### 1.4 Brief Description of Public Participation Process

The Public Participation Process (PPP) is a requirement of the EIA and EMP process and ensures that all relevant IEAPs are consulted and involved. The process ensures that all stakeholders have an opportunity to raise their comments as part of an open and transparent process, which in turn ensures for a complete

comprehensive environmental study. A comprehensive PPP was initiated at an early stage in both Scoping Phases (NEMA and MPRDA) in order for the concerns of I&APs, authorities and the wider public to be recognised and understood. The PPP has

been an ongoing process undertaken throughout the EIA and EMP.

GCS is continuously liaising with DME, keeping all relevant personnel updated on progress and following the advice from DME. The project has been outlined to DME through meetings between GCS and DME, with

an introductory meeting at DCM on  $3^{rd}$  of October 2007. The Scoping Authorities meeting took place on the  $1^{st}$  of Movember 2007. On the  $6^{th}$  of December 2007, another authorities meeting was held, in terms of NEMA, with MDALA, at DCM. The relevant authorities

consulted were identified from authorities that have dealt with DCM in the past.

The existing list of I&APs/Stakeholders from DCM has been updated by GCS through information received in response to the press advertisements and notices. The site notices were placed during the consultation phase to inform the stakeholders about the first public meeting. TCSA, with GCS, has in addition continued in discussions with surrounding landowners who were also included into the database.

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- The National Environmental Management Act, 1998 (Act 107 of 1998);
- The Environment Conservation Act, 1989 (Act 73 of 1989); The National Water Act, 1998 (Act 36 of 1998);
- The Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965);
- The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004);
- The Hazardous Substances Act, 1973 (Act 15 of 1973); and
- The National Heritage Resources Act, 1999 (Act 25 of 1999).

#### 1.5.2 Environmental Process Objectives

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undertaken addressed all phases related to the proposed expansion of the mine. These phases included

Operation phase; and

Construction phase;

- Closure and decommissioning phase.

that the positive impacts are maximised, the environmental study are to meet the following aims: To ensure that the negative impacts are identified and mitigated in the early stages of the project, and

- Follow the guideline process as outlined by the MPRDA;
- Provide input in the feasibility phases to ensure that the most technically feasible, and
- Ensure that impacts are identified early through investigations to minimise environmental damage and environmentally sound options are selected;
- Conduct thorough special investigations that will allow the project team to develop an adequate maximise benefits;
- understanding of the issues to be dealt with;
- Provide ongoing environmental input into the project planning and development; Compile an EIA that will identify, evaluate and address the potential impacts;
- aspects; Compile an EMP that will limit the significance of the negative impacts and maximise the positive
- Ensure that all relevant IBAPs / Stakeholders are consulted and involved throughout the project;

- Ensure that an open and transparent communication structure is in place during the life of the mine;
- Strong emphasis will also be placed on the NEMA process to ensure that the two (2) processes will be able to run concurrently, and will easily be comparable with no confusion between the different

#### 1.5.3 EMP Process

brocesses.

Each specialist was required to identify means of avoiding, mitigating and/or managing the negative impacts in his/her particular aspect of the investigation. The recommended management strategies are synthesised in this report by GCS to formulate the EMP for the proposed mining operation. Management strategies are based on the recommendations by specialists in their specific field of study. The management measures will be incorporated into the mine systems to avoid, or appropriately manage impacts from the outset.

The content of the EMP includes the following, as specified in the MPRDA:

A description of the objectives and specific goals for each phase of the mining operation including:

- Environmental impacts identified;
- Socio-economic conditions;
- Historical and cultural aspects; and
- Mine closure.

An outline of the implementation programme, which must include:

- A description of the chosen appropriate technical and management options for each environmental impact, socio-economic condition and historical and cultural aspects of the preferred alternative under each phase of the mining operation;
- Layout of action plans to achieve the objectives and specific goals (including a time schedule);
- Maintenance and emergency procedures for further remediation;
- Contingency measures;
- Requirements for monitoring and EMP assessment;
- Einancial provision; and
- Environmental awareness plan.

The EIA ensures that the needs of the environment (biophysical and socio-economic) are identified. The EMP in turn provides a tool for meeting the objective to reduce or avoid negative environmental impacts associated with a project within a certain environment by providing detailed mitigation measures and

management commitments.

All of these sections will become legally binding on the approval of this report.

#### 1.6 Report Structure

impact on the environment. implemented in the construction, operation and decommissioning and closure phases to have the minimum The EMP has been compiled to supply the recommended management measures that need to be

Chapter 1: Background and Introduction

- purpose, approach and methodology followed for the completion of this project. This chapter provides a description of the location and the land ownership of the mine, as well as the
- This chapter provides a description of the activities that will happen on the proposed project and the Chapter 2: Activities and Environmental Management Objectives
- Chapter 3: Management Measures environmental management objectives on how to mitigate significant environmental impacts.
- operational, decommissioning and closure phases. This chapter details the required management measures to be implemented during the construction,

Chapter 4: Monitoring and Management Programme

surface water monitoring, groundwater monitoring, air quality monitoring etc.) for the way forward This chapter indicates the monitoring and management measures of environmental impacts (I.e.

should this project be approved.

- This chapter details procedures for environmental related emergencies and remediation measures. Chapter 5: Procedure for Environmental Related Emergencies and Remediation
- This chapter details an environmental awareness plan.
- This chapter assesses the final clean closure cost and the financial provision that needs to be provided Chapter 7: Financial Provision
- Chapter 8: Undertaking by Client for DCM to be able to rehabilitee the entire mining operation after operation seizes.
- This chapter contains the signatures of the mine manager and the director from the DME to make all
- information contained in EMP legally binding.

Chapter 6: Environmental Awareness Plan

The conclusion provides a brief discussion on the findings in the report. Chapter 9: Conclusion

**Appendices** 

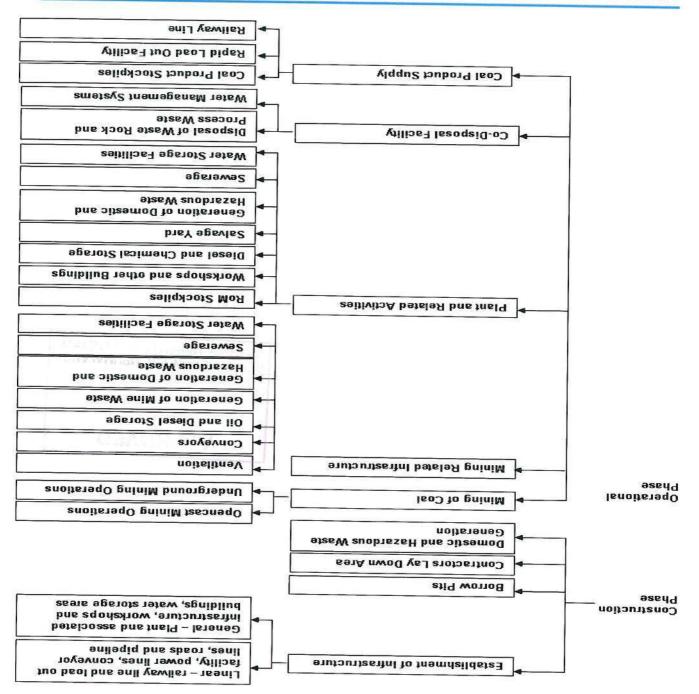
Supporting documentation.

#### 2 ACTIVITIES AND ENVIRONMENTAL MANAGEMENT OBJECTIVES

Prior to identifying the various environmental impacts and the required management measures, it is essential to understand the activities associated with the DCM Expansion Project and the associated environmental objectives.

#### 2.1 Activities

The following diagram is included to outline the various activities which may impact on the environment:



2.2

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During the decommissioning and closure phase the following activities are envisaged:

- Demolishing of infrastructure;
- Making opencast pits safe; and
- Designing area to be free draining.

# Environmental Management Objectives

#### Establishment of Infrastructure

Optimal utilisation and maintenance of existing infrastructure in a well-planned manner where The environmental objectives associated with the establishment of infrastructure are:

- Ongoing maintenance of infrastructure in a well-planned manner;
- To take care that no new land surface, vegetation and habitats outside of the planned mining area are
- destroyed, disturbed and/or alienated;
- To prevent any cumulative impact (i.e. erosion and siltation of watercourses) associated with the
- To ensure an effective surface run-off control system is in order from the commissioning of the removal of vegetation and topsoil;
- To prevent, contain and clean up any spillages during the construction and operational activities; construction activities to deal with the separation of clean and dirty water;
- To reduce the noise associated with the construction and operational activities as far as possible;
- To reduce the dust dispersion as a result of the removal of earth material as far as possible;
- To manage any other nuisance which may occur as a result of the establishment of new infrastructure
- To manage the influx of people seeking work and the potential for informal establishment and (i.e. light pollution);
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as associated petty crimes; and
- far as possible and practical.

#### 2.2.2 Borrow Pits

The environmental objectives associated with the borrow pits are:

- infrastructures will be established in order to minimize the area of disturbance; To limit the borrow pit areas to the areas in which opencast operations will take place and/or other
- To ensure that the original topography is disturbed as little as possible;
- To take care that no new land surface, vegetation and habitats outside of the planned mining area are
- destroyed, disturbed and/or alienated;

To rehabilitate the area as per the closure objectives in order to address all environmental impacts as

far as possible and practical.

#### 2.2.3 Contractors Lay Down Area

will take place and/or where other infrastructure will be established in order to minimise the area of To as for as far as possible aim to establish the contractors lay down area where opencast operations The environmental objectives associated with the contractors lay down area are:

To take care that no new land surface, vegetation and habitats outside of the planned mining area are disturbance;

To prevent any cumulative impact (i.e. erosion and siltation of watercourses) associated with the destroyed, disturbed and/or alienated;

To ensure an effective surface run-off control system is in order to deal with the separation of clean removal of vegetation and topsoil;

To prevent, contain and clean up any spillages during the construction and operational activities; and dirty water;

To strictly manage the activities taking place within the lay down area by implementing clear and

far as possible and practical. To rehabilitate the area as per the closure objectives in order to address all environmental impacts as effective ground rules; and

#### 2.2.4 Domestic and Hazardous Waste Generation

The environmental objectives associated with the generation of waste are:

To enforce policies in terms of the removal of domestic and hazardous waste;

To ensure an effective surface run-off control system is in order to deal with the separation of clean

To prevent, contain and clean up any spillages during the life of mine. and dirty water; and

#### 2.2.5 Mining of Coal

The environmental objectives associated with the mining of coal are:

To optimally utilise the coal mineral reserves within a well planned mining strategy;

destroyed, disturbed and/or alienated; To take care that no new land surface, vegetation and habitats outside of the planned mining area are

To ensure that the original topography is disturbed as little as possible;

and dirty water; To ensure an effective surface run-off control system is in order to deal with the separation of clean

To reduce the noise associated with the construction and operational activities as far as possible;

- To reduce the dust dispersion as a result of the removal of coal reserves as far as possible;
- To have an open channel of communication with the surrounding land owners to ensure that all the
- needs of parties are adhered to as far as practically possible;

  To ensure that the area is safe and will not present a hazard to animal and/or human life; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as

far as possible and practical.

2.2.6 Mining Related Infrastructure

The environmental objectives associated with the mining related infrastructure (i.e. conveyors, adits,

- ventilation, power lines, etc.) are:

  Optimal utilisation and maintenance of existing infrastructure in a well-planned manner where
- Possible;

  To take care that no new land surface, vegetation and habitats outside of the planned mining area are
- destroyed, disturbed and/or alienated;

  To ensure an effective surface run-off control system is in order to deal with the separation of clean
- and dirty water;

  To prevent any cumulative impact (i.e. erosion and siltation of watercourses) associated with the
- To prevent, contain and clean up any spillages in the environment;
- To reduce the noise associated with the construction and operational activities as far as possible; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as
- far as possible and practical.

#### 2.2.7 Plant and Related Infrastructure

The environmental objectives associated with the plant and related infrastructure are:

- Optimal utilization of infrastructure in a well-planned manner;
- To minimize the impact on the surrounding infrastructure when new infrastructure is established;
- destroyed, disturbed and/or alienated;

  To take care that no new land surface, vegetation and habitats outside of the planned mining area are
- To prevent any cumulative impact (i.e. erosion and siltation of watercourses) associated with the removal of vegetation and topsoil;
- To ensure an effective surface run-off control system is in order to deal with the separation of clean
- and dirty water;

  To contain and prevent any pollution from these areas with structures and facilities provided
- To reduce the noise associated with the construction and operational activities as far as possible;
- The sustainable and responsible utilization of all water resources and the prevention of the pollution

thereof; and

To rehabilitate the area as per the closure objectives in order to address all environmental impacts as

far as possible and practical.

#### Co-Disposal Facility 8.2.2

The environmental objectives associated with the co-disposal facility are:

- To take care that no new land surface, vegetation and habitats outside of the planned mining area are Optimal utilization of infrastructure in a well-planned mining strategy;
- destroyed, disturbed and/or alienated;
- To contain and prevent any pollution from waste rock and process waste with structures and facilities
- To ensure an effective surface run-off control system is in order to deal with the separation of clean provided therefore;
- To prevent any cumulative impact (i.e. erosion and siltation of watercourses) associated with the and dirty water;
- To prevent, contain and clean up any spillages in the environment; removal of vegetation and topsoil;
- To reduce the noise associated with the construction activities as far as possible;
- To reduce the dust dispersion as a result of the disposal of material as far as possible; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as
- far as possible and practical.

#### 2.2.9 Coal Product Supply

The environmental objectives associated with the coal product supply are:

- Optimal utilization of infrastructure in a well-planned manner;
- To fulfill the requirements of the RBCT;
- To assist in the supply of coal to Eskom, to alleviate the current strain experienced by it's suppliers
- To take care that no new land surface, vegetation and habitats outside of the planned mining area are
- To contain and prevent any pollution from waste rock and process waste with structures and facilities destroyed, disturbed and/or alienated;
- To ensure an effective surface run-off control system is in order to deal with the separation of clean provided therefore;
- To prevent any cumulative impact (i.e. erosion and siltation of watercourses) associated with the and dirty water;
- To prevent, contain and clean up any spillages in the environment; removal of vegetation and topsoil;
- To reduce the noise associated with the construction and operational activities as far as possible;
- To reduce the dust dispersion as a result of the disposal of material as far as possible; and
- To rehabilitate the area as per the closure objectives in order to address all environmental impacts as

far as possible and practical.

#### 3 MANAGEMENT MEASURES

In terms of The Constitution of the Republic of South Africa (Act No. 108 of 1996) everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, though reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while prompting justifiable economic and social development. The needs of the environment, as well as I&APs should thus be integrated into overall project management. This EMP provides a tool for meeting this objective by providing detailed mitigation and management commitments by the DCM.

The following tables provide the management measures recommended to manage the potential impacts rated in the EIA. In addition to the management measures provided the table indicates the person responsible to ensure that these commitments are adhered to and implemented and the priority of these commitments (either prior a phase, during a phase and/or ongoing).

The responsible person at the DCM Section as well as the responsible parties at Total Coal South Africa

The responsible person at the DCM Section as well as the responsible parties at Total Coal South Africa have assessed these commitments in detail and have committed to the specific management measures where indicated in the table.

# 3.1 Construction Phase

# 3.1.1 Geology

There will be no impact on the geology associated with the construction phase.

					All infrastructure establishment		Activity	
*			potential coal resources.	to the establishment of infrastructure on	The potential sterilisation of coal resources due The mine must		Potential Impact	
	potential coal resources.	mining infrastructure is located on areas of	extent of the resources and ensure that no	geological investigations to determine the	The mine must undertake detailed		Management Measures	
					Ongoing		Frequency	
					N/A	Cost	Management	Annual

## 3.1.2 Topography

																Infrastructure	Construction of Railway line	Activity
														establishment of the railway line.	the micro and macro topography due to the	result of cut and fill methods will impact on	The stockpiling and removal of material as	Potential Impact
upgraded where possible, construction of	<ul> <li>Existing roads and infrastructure should be</li> </ul>	the area to limit cut and fill.	infrastructure should follow the contours of	<ul> <li>Where possible all other linear</li> </ul>	the contours of the area to limit cut and fill.	of the railway line should follow the route of	<ul> <li>Where possible the extension and expansion</li> </ul>	to exceed 18°.	<ul> <li>Slope angles of stockpiles and dumps are not  During construction</li> </ul>	precipitation).	(ensure effective run off from natural	the area after construction is free draining	undertaken in such a way as to ensure that	<ul> <li>The construction activities will be</li> </ul>	within the mining area.	dedicated footprints of the infrastructure	All activities must remain within the	Management Measures
	ĕ																	
	be During construction			During construction			During construction		During construction				construction phase	Prior and during the		construction phase	Prior and during the	Frequency

new roads must be avoided.

	Contractors Lay Down Area	Establishment of Borrow Pits		All other infrastructure	6	Pipeline, Power line,	Activity
topography due to the establishment of a contractor lay down area.	the micro and macro topography due to the construction of borrow pits.  The impact on the micro and macro	The stockpiling and removal of material as result of cut and fill methods will impact on	the micro and macro topography due to the establishment of the infrastructure associated with the mining operation	The stockpiling and removal of material as result of cut and fill methods will impact on		The stockpiling and removal of material as result of cut and fill methods will impact on	Potential Impact
contractors lay down area to the smallest area possible within the mining area.	opencast mining or other mining related infrastructure will be established, to minimize the impact borrow pits will have on the micro and macro topography of the area.  As all activities, limit the footprint of the	<ul> <li>The establishment of borrow pits must be within designated mining areas where</li> </ul>					Management Measures
construction phase	Prior and during	Prior and during construction phase	EDICATE PARTICIPATION OF THE P	During the construction phase		During the construction phase	Frequency
construction costs	Included in	Included in costs					Annual Management Cost

### 3.1.3 Soils

		terraces).			
		engineered erosion control measures (i.e.			
		higher than 1.5m must be equipped with			
		volume of soil to be removed. Any stockpile			
		The stockpile heights will be calculated by the			
		vegetation.			
		allow for the establishment of natural			
		stockpiled. The spraying product utilised must			
		dust allaying agent immediately after being			
		<ul> <li>Topsoils and subsoils will be sprayed with a</li> </ul>			
		considered.			
construction costs	construction phase	nutrients from the soils during stockpiling is			
Included in	Prior and during	necessary to ensure that the possible loss of			
		suitability for use during rehabilitation. This is			
		must be undertaken, to determine their			
		additional sampling and analysis of the soils			
		<ul> <li>Prior to the removal of the soils for stockpiling</li> </ul>			
		soil and be clearly identifiable.			
		separately in the vicinity of the source of the			
		<ul> <li>Topsoil and subsoil are to be stockpiled</li> </ul>			
		rehabilitation of the final land form.			
		<ul><li>Topsoil's will be stockpiled for later use in the</li></ul>			
		hard rock is reached.	of the railway line.		Infrastructure
		<ul> <li>Topsoil will be stripped to 300mm or up until</li> </ul>	Loss of the soil resource due to the establishment	Railway line	Construction of
Annual Management Cost	Frequency	Management Measures	Potential Impact		Activity

Activity Potential Impact Management Measures Frequency

railway line. Erosion as a result of the establishment of the • Vegetation establishment in disturbed areas

Rapid growth of vegetation on stockpiles must be promoted by means of watering.

Management Cost

- will be undertaken as soon as practically possible.
- Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.
- Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%.
- The mine will ensure that all erosion controls are included in the designs of all linear infrastructure (railway lines, power lines, conveyors, pipelines etc.) and points of water discharge.
- Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.
- Soil replacement and the preparation of a seedbed to facilitate the revegetation program to limit potential erodibility should be implemented.

Prior and during construction

Included in construction costs

07-100			Activity
August 2009			Potential Impact  Soil physical and chemical degradation as result of railway line establishment.
an appropriate qualified specialist. Waste should be removed by licensed waste disposal companies.  Should chemical thates be utilised the sewage must be removed by a licensed company.  The mine must adopt the cradle to grave	<ul> <li>Major spillage incidents will be reported to the DME, DWAF, MDALA and the Department of Agriculture. Appropriate remedial measures will be implemented in consultation with these regulatory authorities.</li> <li>If spills do occur and soils become contaminated, the appropriate remedial measures will be identified in consultation with</li> </ul>	vegetation. See management and monitoring programs in EMP for fertilizer usage as recommended by specialist.  • Vegetation establishment in disturbed areas will be undertaken as soon as practically possible, with the growing season and water availability being the primary constraints.  • There will be an incident management system including procedures and training for dealing	Management Measures  The mine will ensure that equipment movement over the stockpiles will be limited to avoid soil compaction and subsequent damage to soil structure or the seed bank.  Should vegetation be required, fertilizer will be applied to the topsoil stockpiles prior to
	Prior and during construction		Frequency
	Spill Kits R120 000 Included in construction costs	Included in construction costs Included in construction costs	Annual  Management Cost  Included in  construction costs  construction costs

		Þ
07-100		Activity
August 2009	Soil compaction due to different types of soils, and their wetness factor, during the construction of the railway line.	Potential Impact
	cla rel aff store pri	Mana
Page 3-8	If necessary, the polluted soils will be classified as waste and will be discarded at an appropriate permitted waste site. After the removal of the contaminated soils, the affected areas will be landscaped and rehabilitated.  A detailed waste management strategy will be established and implemented.  Best waste management practices should be emphasized during the induction phase and on ongoing basis.  Compaction is a problem to contend with if these soils are to be worked during the wet months of the year.  Stockpiling of these soils should be done separately from the dry soils, and greater care is needed with the management of erosion problems during storage.  Any strong structure that develops during the stockpiling stage will need to be dealt with prior to the use of this material for rehabilitation.	Management Measures
	Prior and during construction  Prior and during construction	Frequency
	Included in the construction costs Included in the construction costs Included in the construction costs construction costs	Annual Management Cost

ACLIVILY	
rocenical impact	Details I Impact
Mailageilleilt Measures	Management Montage
i i equelicy	Front
Management Cost	Annual

Loss of the soil resource due to the establishment . Topsoil will be stripped to 400mm or up until hard rock is reached.

Topsoil's will be stockpiled for later use in the

line, Conveyors Pipeline, Power

of the pipeline, power lines and conveyors.

- separately in the vicinity of the source of the Topsoil and subsoil are to be stockpiled rehabilitation of the final land form.
- Prior to the removal of the soils for stockpiling soil and be clearly identifiable.
- considered. nutrients from the soils during stockpiling is necessary to ensure that the possible loss of suitability for use during rehabilitation. This is must be undertaken, to determine their additional sampling and analysis of the soils
- vegetation. allow for the establishment of natural stockpiled. The spraying product utilised must dust allaying agent immediately after being Topsoils and subsoils will be sprayed with a
- terraces). engineered erosion control measures (i.e. higher than 1.5m must be equipped with volume of soil to be removed. Any stockpile The stockpile heights will be calculated by the
- Rapid growth of vegetation on stockpiles must be promoted by means of watering.

Prior and during construction construction costs Included in

07-100

Activity	
Potential Impact	
Management Measures	
Frequency	

Annual

Management Cost

pipeline, power lines and conveyors.

Erosion with regards to the establishment of the • Vegetation establishment in disturbed areas will be undertaken as soon as practically

possible.

- Where disturbed areas cannot be re-vegetated agent, terraces, rock cladding, etc.) must be erosion control measures (i.e. dust allying implemented. during the life of operations, appropriate
- Erosion control measures are required on all exceeding 15%. control measures are required on all slopes slopes exceeding 2% and engineering erosion
- The mine will ensure that all erosion controls conveyors, pipelines etc.) and points of water are included in the designs of all linear infrastructure (railway lines, power lines,
- Areas where erosion control measures have weekly basis to determine the effectiveness. been implemented must be inspected on a
- Soil replacement and the preparation of a implemented. to limit potential erodibility should be seedbed to facilitate the revegetation program

Prior and during construction

Included in

construction costs

07-100												Activity
August 2009											Soil physical and chemical degradation as result of pipeline, power lines and conveyors establishment.	Potential Impact
are	as waste and will be discarded at an appropriate permitted waste site. After the removal of the contaminated soils, the	an appropriate qualified specialist. If necessary, the polluted soils will be classified	contaminated, the appropriate remedial measures will be identified in consultation with	regulatory authorities.  If spills do occur and soils become	Agriculture. Appropriate remedial measures will be implemented in consultation with these	<ul> <li>with incidents.</li> <li>Major spillage incidents will be reported to the</li> </ul>	<ul> <li>There will be an incident management system including procedures and training for dealing</li> </ul>	possible, with the growing season and water availability being the primary constraints.	<ul> <li>Vegetation establishment in disturbed areas will be undertaken as soon as practically</li> </ul>	<ul> <li>damage to soil structure or the seed bank.</li> <li>Should vegetation be required, fertilizer will be applied to the topsoil stockpiles prior to vegetation.</li> </ul>	<ul> <li>The mine will ensure that equipment movement over the stockpiles will be limited to avoid soil compaction and subsequent</li> </ul>	Management Measures
				Prior and during construction								Frequency
			construction costs	Included in	X120 000	Spillkits					Included in construction costs	Annual Management Cost

A detailed waste management strategy will be

rehabilitated.

infrastructure	All o																								Activity	
re of other infrastructure.	other Loss of the soil resource due to the establishment								of pipelines, power lines and conveyors.	and their wetness factor, during the construction	Soil compaction due to different types of soils,														Potential Impact	
hard rock is reached.  Topsoil's will be stockpiled for later use in the rehabilitation of the final land form.	<ul> <li>Topsoil will be stripped to 400mm or up until</li> </ul>	prior to the use of this material for rehabilitation.	stockpiling stage will need to be dealt with	<ul> <li>Any strong structure that develops during the</li> </ul>	problems during storage.	is needed with the management of erosion	separately from the dry soils, and greater care	<ul> <li>Stockpiling of these soils should be done</li> </ul>	months of the year.	these soils are to be worked during the wet	<ul> <li>Compaction is a problem to contend with if</li> </ul>	ongoing basis.	emphasized during the induction phase and on	Dest waste Illaliagelliellt plactices slibata be	Post waste management practices should be	established and implemented.	<ul> <li>A detailed waste management strategy will be</li> </ul>	rehabilitated.	affected areas will be landscaped and	removal of the contaminated soils, the	appropriate permitted waste site. After the	classified as waste and will be discarded at an	<ul> <li>If necessary, the polluted soils will be</li> </ul>		Management Measures	
						construction	Prior and during										construction	Prior and during							Frequency	
						construction costs	Included in						construction costs	ווכנשמבט ווו מזכ	Included in the	construction costs	Included in the					construction costs	Included in the	·	Management Cost	

|--|--|

- soil and be clearly identifiable. Topsoil and subsoil are to be stockpiled separately in the vicinity of the source of the
- Prior to the removal of the soils for stockpiling considered. suitability for use during rehabilitation. This is must be undertaken, to determine their additional sampling and analysis of the soils nutrients from the soils during stockpiling is necessary to ensure that the possible loss of
- allow for the establishment of natural stockpiled. The spraying product utilised must dust allaying agent immediately after being Topsoils and subsoils will be sprayed with a vegetation.
- The stockpile heights will be calculated by the terraces). engineered erosion control measures (i.e. higher than 1.5m must be equipped with volume of soil to be removed. Any stockpile
- Rapid growth of vegetation on stockpiles must vegetation should self-succession not establish. be promoted by means of watering and

Prior and during

construction

construction costs

Management Cost Annual

Included in

07-100

infrastructure.

- Erosion with regards to the establishment of other Vegetation establishment in disturbed areas will be undertaken as soon as practically possible and only if self succession does not
- during the life of operations, appropriate implemented. agent, terraces, rock cladding, etc.) must be erosion control measures (i.e. dust allying Where disturbed areas cannot be re-vegetated
- exceeding 15%. Erosion control measures are required on all control measures are required on all slopes slopes exceeding 2% and engineering erosion
- discharge. conveyors, pipelines etc.) and points of water infrastructure (railway lines, power lines, are included in the designs of all linear The mine will ensure that all erosion controls
- Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.
- Soil replacement and the preparation of a seedbed to facilitate the revegetation program implemented. to limit potential erodibility should be

Prior and during construction

construction costs Included in

07-100

Activity Potential Impact Management Measures Frequency

> Management Cost Annual

of other infrastructure establishment. Soil physical and chemical degradation as result . The mine will ensure that equipment

damage to soil structure or the seed bank. to avoid soil compaction and subsequent movement over the stockpiles will be limited

- Should vegetation be required, fertilizer will programs in EMP for fertilizer usage as be applied to the topsoil stockpiles prior to recommended by specialist. vegetation. See management and monitoring
- availability being the primary constraints. Vegetation establishment in disturbed areas possible, with the growing season and water will be undertaken as soon as practically
- with incidents. There will be an incident management system including procedures and training for dealing
- Major spillage incidents will be reported to the regulatory authorities. will be implemented in consultation with these Agriculture. Appropriate remedial measures DME, DWAF, MDALA and the Department of
- If spills do occur and affected areas will be landscaped and appropriate permatted waste site. After the necessary, the polluted soils will be classified an appropriate qualified specialist. measures will be identified in consultation with contaminated, the appropriate remedial removal of the contaminated soils, the as waste and will be discarded at an soils become

Prior and during construction

construction costs Included in

07-100

August 2009

Establishment of Borrow Pits Activity of the all other infrastructure. and their wetness factor, during the construction Loss of soil resource due to the establishment of Soil compaction due to different types of soils, borrow pits. Potential Impact Compaction is a problem to contend with if Management Measures Any strong structure that develops during the Stockpiling of these soils should be done prior to the use of this material for stockpiling stage will need to be dealt with problems during storage. is needed with the management of erosion separately from the dry soils, and greater care months of the year. these soils are to be worked during the wet Topsoil will be stripped to 400mm or up until minimal effect on soil resources. establishment within these areas will have the area or opencast mining areas). The mining infrastructure (i.e. co-disposal facility designated mining areas, or where the Borrow pits needs to be established within footprint of the area will become part of the rehabilitation. Frequency Prior and during Prior and during construction construction Management Cost construction costs construction costs Included in Included in

additional sampling and analysis of the soils must be undertaken, to determine their

Prior to the removal of the soils for stockpiling

rehabilitation of the final land form.

Topsoil's will be stockpiled for later use in the

hard rock or borrow pit material is reached.

Annual

Management Cost

suitability for use during rehabilitation. This is necessary to ensure that the possible loss of nutrients from the soils during stockpiling is considered.

- Topsoil and subsoil not used as borrow pit material are to be stockpiled separately in the vicinity of the source of the soil and be clearly identifiable.
- Topsoils and subsoils not used as borrow pit material will be sprayed with a dust allaying agent immediately after being stockpiled. The spraying product utilised must allow for the establishment of natural vegetation.
- The stockpile heights will be calculated by the volume of soil to be removed. Any stockpile higher than 1.5m must be equipped with engineered erosion control measures (i.e. terraces).

Activity

### Potential Impact

# Management Measures

### Frequency

Annual

Management Cost

and establishment of borrow pits. Soil compaction due to different types of soils, their wetness factor, during the

 Compaction is a problem to contend with if these soils are to be worked during the wet months of the year.

- Stockpiling of these soils should be done problems during storage. is needed with the management of erosion separately from the dry soils, and greater care
- Any strong structure that develops during the prior to the use of this material for stockpiling stage will need to be dealt with rehabilitation.

Prior and during construction

construction costs Included in

07-100

Contractors Lay Down Area

of the Contractors Lay Down Area.

Activity Potential Impact Management Measures Frequency Annual Management Cost

Loss of the soil resource due to the establishment . Contractors Lay Down Area needs to be disposal facility area or opencast mining part of the mining infrastructure (i.e. cowhere the footprint of the area will become established within designated mining areas, or

- Topsoil will be stripped to 400mm or up until hard rock is reached.
- rehabilitation of the final land form. Topsoil's will be stockpiled for later use in the
- soil and be clearly identifiable. Topsoil and subsoil are to be stockpiled separately in the vicinity of the source of the
- considered. Prior to the removal of the soils for stockpiling nutrients from the soils during stockpiling is suitability for use during rehabilitation. This is must be undertaken, to determine their additional sampling and analysis of the soils necessary to ensure that the possible loss of

areas). The establishment within these areas will have the minimal effect on the loss of soil Prior and during

construction construction costs Included in

07-100

		2000	
Prior and during construction	<ul> <li>Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.</li> <li>Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.</li> <li>Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.</li> </ul>	Erosion with regards to the establishment of the Contractors Lay Down Area.	
Prior and during construction	<ul> <li>Topsoils and subsoils will be sprayed with a dust allaying agent immediately after being stockpiled. The spraying product utilised must allow for the establishment of natural vegetation.</li> <li>The stockpile heights will be calculated by the volume of soil to be removed. Any stockpile higher than 1.5m must be equipped with engineered erosion control measures (i.e. terraces).</li> <li>Rapid growth of vegetation on stockpiles must be promoted by means of watering.</li> </ul>		
Frequency	Management Measures	Potential Impact	Activity

Potential Impact

Management Measures

Frequency

Annual

Management Cost

 Soil replacement and the preparation of a seedbed to facilitate the revegetation program to limit potential erodibility should be implemented.

07-100

August 2009

Page 3-21

Potential Impact

прасс

Management Measures

Frequency

Annual

Management Cost

Soil physical and chemical degradation as result of the Contractors Lay Down Area establishment.

Contractors Lay Down Area needs to be established within designated mining areas, or where the footprint of the area will become part of the mining infrastructure (i.e. opencast mining areas). The establishment within these areas will have the minimal effect on the physical and chemical degradation of soil resources.

- The mine will ensure that equipment movement over undesignated areas and stockpiles will be limited to avoid soil compaction and subsequent damage to soil structure or the seed bank.
- Should vegetation be required, fertilizer will be applied to the topsoil stockpiles prior to vegetation. See management and monitoring programs in EMP for fertilizer usage as recommended by specialist.
- Fairly standard fertilizer treatments will be needed for optimum agricultural production of crops on areas that have previously been planted, and/or stockpiled for any length of time.

Prior and during construction

Included in construction costs

07-100		Activity
August 2009	Harding ton	Potential Impact
Page 3-23	<ul> <li>Vegetation establishment in disturbed areas will be undertaken as soon as practically possible, with the growing season and water availability being the primary constraints.</li> <li>There will be an incident management system including procedures and training for dealing with incidents.</li> <li>A detailed waste management strategy will be established and implemented.</li> <li>Best waste management practices should be emphasized during the induction phase and on ongoing basis.</li> <li>Waste should be removed by licensed waste disposal companies.</li> <li>Should chemical toilets be utilised the sewage must be removed by a licensed company.</li> <li>The mine must adopt the cradle to grave principle.</li> </ul>	Management Measures
	Prior and during construction	Frequency
	Included in costs	Annual Management Cost

Generation of Domestic and/or Hazardous Waste	Activity
mestic and/or	
Soil compaction due to different types of soils, and their wetness factor, during the lay down of the contractors' area.  Soil structure contamination due to waste contamination and spillages.	Potential Impact
<ul> <li>Compaction is a problem to contend with if these soils are to be worked during the wet months of the year.</li> <li>Stockpiling of these soils should be done separately from the dry soils, and greater care is needed with the management of erosion problems during storage.</li> <li>Any strong structure that develops during the stockpiling stage will need to be dealt with prior to the use of this material for rehabilitation.</li> <li>There will be an incident management system including procedures and training for dealing with incidents.</li> <li>Major spillage incidents will be reported to the DME, DWAF, MDALA and the Department of Agriculture. Appropriate remedial measures will be implemented in consultation with these regulatory authorities.</li> <li>If spills do occur and soils become contaminated, the appropriate remedial measures will be identified in consultation with</li> </ul>	Management Measures
Prior and during construction  Prior and during construction	Frequency
Included in construction costs  Part of construction costs  Spill Kits R120000  Included in construction costs	Annual Management Cost

necessary, the polluted soils will be classified as waste and will be discarded at an appropriate permitted waste site. After the

an appropriate qualified specialist.

=

														Activity
														Potential Impact
principle.	<ul> <li>The mine must adopt the cradle to grave</li> </ul>	must be removed by a licensed company.	<ul> <li>Should chemical toilets be utilised the sewage</li> </ul>	disposal companies.	<ul> <li>Waste should be removed by licensed waste</li> </ul>	ongoing basis.	emphasized during the induction phase and on	<ul> <li>Best waste management practices should be</li> </ul>	established and implemented.	<ul> <li>A detailed waste management strategy will be</li> </ul>	rehabilitated.	affected areas will be landscaped and	removal of the contaminated soils, the	Management Measures
	grave		ewage		waste		and on	uld be		will be		and	, the	Frequency
				R96 000	Chemical toilets									Annual Management Cost

August 2009

# 3.1.4 Ecology (Fauna and Flora)

			Conveyors	Power line,	Pipeline,	וווו פאמ מכנמו כ	Construction of Railway line	Activity
				e,	Removal of all vegetation.		Removal of vegetation from railway servitude.	Potential Impact
planted on soils that are leached or eroded and that have low organic matter content. Add	<ul><li>Fertilizers are required where grass is to be</li></ul>	<ul> <li>In areas disturbed the main grass species will be reintroduced after fertilization has been</li> </ul>	<ul> <li>Where possible as little as possible vegetation should be removed.</li> </ul>	designated areas.	<ul> <li>Construction activities should be limited to the</li> </ul>	should be removed.	The railway will be a permanent fixture.  Where perills as little as persills contains	Management Measures
construction	Prior and during					construction	Drior and during	Frequency
construction costs	Included in					construction costs	included in	Annual Management Cost

study, see EMP Section 4).

The need for fertilizer will be determined by

the recommendations of the specialist soil

coverage of the grass to bind soils.

minimum recommended amounts of fertilizer to get successful establishment and good

	Activity
Removal of indigenous vegetation  Dust deposition  Destruction of natural habitat for fauna	Potential Impact
<ul> <li>Revegetate sites with the main grass species after operations have ended. Revegetation of the area will ensure that erosion of the site will be kept to a minimum.</li> <li>Should any rare or endangered species be found within the Expansion Project area will they be relocated under the guidance of MDALA.</li> <li>The potential for dust will be kept to a minimum.</li> <li>Dust must be suppressed by using the same dust suppression method as for topsoil stockpiles.</li> <li>Due to the high level of mechanisation of the project, most, if not all animal species will relocate from the area of disturbances and find alternate habitat in the vicinity. This will however be a low to moderate impact with mitigation owning to the fact that the land is predominately under crops and, as a result,</li> </ul>	Management Measures
Prior and during construction  Prior and during construction  Prior and during construction	Frequency
Included in construction costs  Included in construction costs  R432 000  Included in construction costs	Annual Management Cost

 The animals will move back once mining activities have ceased and rehabilitation has

the diversity of the animal species is low.

taken place.

07-100																												ACTIVITY	
															infrastructure	All other													
August 2009																Removal of all vegetation										Poaching and hunting of animals		Potential Impact	
Page 3-28	study, see EMP Section 4)).	the recommendations of the specialist soil	<ul> <li>The need for fertilizer will be determined by</li> </ul>	coverage of the grass to bind soils.	to get successful establishment and good	minimum recommended amounts of fertilizer	and that have low organic matter content. Add	planted on soils that are leached or eroded	<ul> <li>Fertilizers are required where grass is to be</li> </ul>	added.	be reintroduced after fertilization has been	In areas disturbed the main grass species will	should be removed.	<ul><li>Where possible as little as possible vegetation</li></ul>	designated areas.	<ul> <li>Construction activities should be limited to the</li> </ul>	issues.	must continuously be updated of all new	environmental issues during induction, and	<ul> <li>All employees will be made aware of all</li> </ul>	hunting of animals.	<ul> <li>Fines will be implemented for poaching and</li> </ul>	animals on site.	lead to a potential for poaching and hunting of	amount of people will increase and this could	<ul> <li>Due to the activities during construction the</li> </ul>		Management Measures	
								construction	Prior and during												construction	Prior and during						Frequency	
								construction costs	included in												construction costs	included in					Cost	Management	Annual

																						Activity	
										Destruction of natural habitat for fauna			Dust deposition						Removal of indigenous vegetation			Potential Impact	
taken place.	activities have ceased and rehabilitation has	<ul> <li>The animals will move back once mining</li> </ul>	the diversity of the animal species is low.	predominately under crops and, as a result,	mitigation owning to the fact that the land is	however be a low to moderate impact with	find alternate habitat in the vicinity. This will	relocate from the area of disturbances and	project, most, if not all animal species will	<ul> <li>Due to the high level of mechanization of the</li> </ul>	stockpiles.	dust suppression method as for topsoil	<ul> <li>Dust must be suppressed by using the same</li> </ul>	minimum.	The potential for dust will be kept to a	will be kept to a minimum.	the area will ensure that erosion of the site	after operations have ended. Revegetation of	<ul> <li>Revegetate sites with the main grass species</li> </ul>		mailageilleilt Measules	Management Mossille	
				construction	rilor and during						construction	Prior and during				construction	Prior and during				Frequency	1	
				construction costs	Included in						R432 000	Construction Costs				construction costs	included in			COST	Management	Annual	

	Activity
Poacning and hunting of animals	Potential Impact
<ul> <li>Due to the activities during construction the amount of people will increase and this could lead to a potential for poaching and hunting of animals on site.</li> <li>Fines will be implemented for poaching and hunting of animals.</li> <li>All employees will be made aware of all environmental issues during induction, and must continuously be updated of all new issues.</li> </ul>	Management Measures
	Frequency
	Annual Management Cost

# 3.1.5 Surface Water

	Activity  Construction of Railway line
coefficient of the area will increase and therefore higher volumes of water will be produced during rain events.  In addition to this the changing of the land profile could increase erosion and contribute to the siltation of water courses.  Dust from equipment or vehicle movement could impact on the surface water quality.	
implemented prior to the commencement of construction activities, and should be designed for the 1:50 year storm event with additional capacity as an emergency measure (0.8m freeboard).  No infrastructure is to be placed within the 1:100 year floodline without the necessary authorisation.  Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.  Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.  The mine will ensure that all erosion controls are included in the designs of all linear infrastructure and points of water discharge.  Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.	Management Measures
Prior and during construction	Frequency
Included in costs	Annual Management Cost

		Activity
The establishment of infrastructure will limit reduce the catchment area.	The type of material used during the construction activities may impact on the surface water quality.	Potential Impact
<ul> <li>Clean and dirty water systems should be implemented prior to the commencement of construction activities.</li> <li>All activities must remain within the dedicated footprints of the infrastructure within the mining area.</li> </ul>	<ul> <li>Soil replacement and the preparation of a seedbed to facilitate the revegetation program to limit potential erodibility should be implemented.</li> <li>No carbonaceous materials must be used during the construction phase.</li> </ul>	Management Measures
Prior and during construction	Prior and during construction	Frequency
Included in construction costs	Included in construction costs	Annual Management Cost

All

other

### Potential Impact

# Management Measures

### Frequency

Annual

Management

Cost

infrastructure erosion and contribute to the siltation of water the changing of the land profile could increase produced during rain events. In addition to this coefficient of the area will increase and therefore higher volumes of water will be

Due to increase in bare surfaces, the runoff . Clean and dirty water systems should be construction activities. implemented prior to the commencement of

Vegetation establishment in disturbed areas

- agent, terraces, rock cladding, etc.) must be erosion control measures (i.e. dust allying during the life of operations, appropriate Where disturbed areas cannot be re-vegetated possible. will be undertaken as soon as practically
- The mine will ensure that all erosion controls are included in the designs of all linear infrastructure and points of water discharge.
- Areas where erosion control measures have weekly basis to determine the effectiveness. been implemented must be inspected on a
- Soil replacement and the preparation of a implemented. to limit potential erodibility should be seedbed to facilitate the revegetation program

Prior and during

implemented.

construction costs Included in

construction

Page 3-33

	Activity
reduce the catchment area.	Potential Impact
reduce the catchment area.  In reduce the catchment area. Structure within the dedicated footprints of the infrastructure within the mining area.	Management Measures
Prior and during construction	Frequency
Included in construction costs	Annual Management Cost

contained area. undertaken outside of an effectively designed

- A spill contingency plan should be available All hydrocarbons and other chemicals should 110% of the volume stored within. be stored in bunded area with a capacity of
- and enforced.
- Spill clean up kits should be available at each area where hydrocarbons are being utilised.
- During induction and ongoing all employees contaminated spill areas. must be trained in how to rehabilitate
- with incidents. including procedures and training for dealing MSDS sheets should be available where There will be an incident management system hydrocarbons or other chemicals are stored.
- Major spillage incidents will be reported to the will be implemented in consultation with these Agriculture. Appropriate remedial measures DME, DWAF, MDALA and the Department of regulatory authorities.

Prior and during construction

R120 000-Spill Kits

			reduce the	Establishment of Borrow Pits The establ																				rotellud limpact	
			reduce the catchment area.	The establishment of infrastructure will limit																				Impact	
	<ul> <li>All activities must remain within the dedicated</li> </ul>	construction activities.	implemented prior to the commencement of	<ul> <li>Clean and dirty water systems should be</li> </ul>	emergency must be communicated.	procedures in case of any environmental	issues. Mitigation measures and operational	must continuously be updated of all new	environmental issues during induction, and	<ul> <li>All employees will be made aware of all</li> </ul>	established and implemented	<ul> <li>A detailed waste management strategy will be</li> </ul>	rehabilitated.	affected areas will be landscaped and	removal of the contaminated soils, the	appropriate permitted waste site. After the	as waste and will be discarded at an	necessary, the polluted soils will be classified	with an appropriate qualified specialist. If	measures will be identified in consultation	contaminated, the appropriate remedial	If spills do occur and soils become		Management Measures	F-B/1100000000000000000000000000000000000
	construction	Prior and during										construction	Prior and during											Frequency	
בטווטנו מכנוסוו בטאנא	Construction costs	included in										R120 000-	Spill Kits										Cost	Management	

mining area.

footprints of the infrastructure within the

Hazardous Waste Generation of Domestic and/or The incorrect disposal of domestic and/or • There will be an incident management system Activity pollution of surface water resources. hazardous waste could contribute to the Potential Impact Management Measures appropriate permitted waste site. After the Major spillage incidents will be reported to the as waste and will be discarded at an necessary, the polluted soils will be classified with an appropriate qualified specialist. If measures will be identified in consultation contaminated, the appropriate remedial If spills do occur and soils become regulatory authorities. will be implemented in consultation with these with incidents. including procedures and training for dealing DME, DWAF, MDALA and the Department of Agriculture. Appropriate remedial measures Frequency Prior and during construction Cost Management Annual R120 000-Spill Kits

Best waste management practices should be emphasized during the induction phase and on ongoing basis.

Waste should be removed by licensed waste

A detailed waste management strategy will be

affected areas will be landscaped and

removal of the contaminated soils,

the

rehabilitated.

established and implemented.

 Waste should be removed by licensed waste disposal companies.

Should chemical toilets be utilised the sewage

07-100

August 2009

Page 3-37

Activity

Potential Impact

Management Measures

Frequency

Annual

Cost

Management

must be removed by a licensed company.

- The mine must adopt the cradle to grave principle.
- All employees will be made aware of all environmental issues during induction, and must continuously be updated of all new issues. Mitigation measures and operational procedures in case of any environmental emergency must be communicated.

07-100

August 2009

Page 3-38

### 3.1.6 Groundwater

Construction of Railway line Infrastructure	Activity
y line Groundwater level changes and change in water No mitigation measures can be implemented quality due to the surface infrastructure construction relating to the railway line	Potential Impact
r No mitigation measures can be implemented	Management Measures
	Frequency
	Annual Management Cost

Conveyors Power Pipeline, line, quality due to the surface infrastructure construction relating to the railway line Groundwater level changes and change in water

₽ infrastructure other boxcut, stockpiles and pollution control dams

- No mitigation measures can be implemented
- Negative impact on groundwater quality from . Stockpiles must be on designated areas that are lined, and measures must be implemented to decrease dust from stockpiles.
- area and be within designated areas. control dams must be within the mining rights The construction of stockpiles and pollution
- All pollution control dams must be lined to mitigate and reduce impact on groundwater water systems must be implemented to Around all infrastructure dirty water and clean underground reduce the potential for leakage into aquifers. Investigations to

Prior and during construction construction costs Included in

stockpiles be lined. is recommended that dirty water drains and pollution control dams must be investigated. It determine the most viable lining options for

dewatering of the mining pits as construction starts. Negative impact on groundwater levels due to the

The ongoing monitoring and reporting programme of the project. must already be in place when construction levels must be undertaken throughout all stages starts. The ongoing reporting on groundwater

Groundwater level changes and change in water relating to the railway line quality due to the surface infrastructure construction

> construction costs Groundwater Included in

No mitigation measures can be implemented

construction

Prior and during

monitoring R100 000

Establishment of Borrow Pits

constructed. dewatering of Negative impact on groundwater levels due to the areas where borrow pits are

must already be in place when construction starts. The ongoing reporting on groundwater levels must be undertaken throughout all stages

The ongoing monitoring and reporting programme

of the project.

Negative impact on groundwater quality from borrow The construction of borrow pits, stockpiles and rights area and be within designated areas. pollution control dams must be within the mining

pit construction.

and reduce impact on groundwater aquifers. water systems must be implemented to mitigate Around all infrastructure dirty water and clean

> Prior and during construction

> > Included in

construction costs

Groundwater monitoring R100 000

Included in

construction costs Groundwater

Prior and during

construction

monitoring R100 000

07-100

August 2009

### 3.1.7 Wetlands

Infrastructure infrastructure, including contractors (down area	
Clearing of wetland vegetation and destruction e, of wetland habitat.  lay	Potential Impact
<ul> <li>All wetlands must be clearly demarcated.</li> <li>All construction servitudes should be located outside the wetland areas, where possible.</li> <li>All activities must remain within the dedicated footprints of the infrastructure within the mining area.</li> <li>Where servitudes do intrude into the wetlands these areas will need to be ripped. The area must be re-vegetated by a suitable mix of plant species as determined by a qualified botanist.</li> <li>After construction, all areas devoid of vegetation must be ploughed and re-vegetated with a suitable mix of indigenous plant species as determined by a qualified botanist.</li> <li>Invasion by alien species should be monitored and managed.</li> <li>Where possible the railway line should cross all wetland and rivers perpendicular to the direction of flow.</li> <li>Where this is not practically possible, sufficient culverts should be placed along the</li> </ul>	Management Measures
Prior and during construction	Frequency
Included in construction costs	Annual Management Cost

crossing to ensure flows remain spread across

Management Cost

the width of the wetland.

Increased sediment movement off the site due to erosion on bare soil surfaces and increased sediment load in the valley bottom wetlands.

Bare areas must be vegetated with a suitable mix of indigenous plant species as determined by a qualified botanist immediately where necessary.

Erosion control measures must

be

implemented and maintained.

- Where possible storm water should be conveyed through grassed swales, rather than concrete channels to aid infiltration and reduce run off volumes.
- Should storm water be discharged into wetlands, gabions should be constructed to contain erosion (this should be done in consultation with an appropriate wetland and storm water specialist.
- The gabion structures should include measures to dissipate energy of flows and to disperse flows over a greater area.

Prior and during construction

Included in construction

costs

Page 3-42

07-100

August 2009

Establishment of Borrow Pits	Activity
Soil compaction in areas traversed by heavy machinery.  The destruction of wetland due to the establishment of borrow pits.	Potential Impact
<ul> <li>Construction servitudes must be kept as narrow as possible.</li> <li>All activities must remain within the dedicated footprints of the infrastructure within the mining area.</li> <li>All infrastructure should be located outside the wetland boundaries as far as is practically possible.</li> <li>Where compaction is evident, ongoing ripping must be undertaken to break up the compacted soil surface.</li> <li>Should self succession of vegetation not take place, the area must be re-vegetated.</li> <li>Borrow pits should as far as possible be located within the footprints of the opencast operations.</li> <li>Should other areas be required the borrow pits must remain outside the wetland boundaries as</li> </ul>	Management Measures
Prior and during construction  Prior and during construction	Frequency
Included in construction costs	Annual Management Cost

far as is practically possible.

			Hazardous Waste	Generation of Domestic and/o	Activity
				Generation of Domestic and/or The potential pollution of wetlands	Potential Impact
<ul><li>must be removed by a licensed company.</li><li>The mine must adopt the cradle to grave principle.</li></ul>	<ul> <li>Waste should be removed by licensed waste disposal companies.</li> <li>Should chemical toilets be utilised the sewage</li> </ul>	emphasized during the induction phase and on ongoing basis.	be available and enforced on site.  Best waste management practices should be	<ul> <li>A comprehensive waste management plan must</li> </ul>	Management Measures
	construction	Prior and during			Frequency
	costs Including Spill Kits	Included in construction			Annual Management Cost

### 3.1.8 Air Quality

Construction of Infrastructure	Activity
Air borne dust as a result of site clearing and construction vehicles travelling on gravel roads.	Potential Impact
<ul> <li>Where vehicles are used the limited of vehicle speeds, especially during high risk periods of high winds, high temperature and low humidity should be enforced.</li> <li>Ongoing ambient and PM10 monitoring must be implemented with dust monitors concentrated to the wets of the site.</li> <li>Effective dust management practices should be employed.</li> <li>Gravel roads, topsoils and subsoils will be sprayed with a dust allaying agent immediately after being stockpiled. The spraying product utilised must allow for the establishment of natural vegetation.</li> <li>The stockpile heights will be calculated by the volume of soil to be removed. Any stockpile higher than 1.5m must be equipped with engineered erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%.</li> </ul>	Management Measures
Prior and during construction	Frequency
Included in construction costs Dust Management R432 000 Dust Monitoring R166 000	Annual Management Cost

07-100

August 2009

Potential Impact

Management Measures

Frequency

Annual Management

Cost

 Rapid growth of vegetation on stockpiles must vegetation should self-succession not establish. be promoted by means of watering and

August 2009

07-100

3.1.9 Sites of Historical and Cultural Importance

siding	Construction of Railway line	Activity
	The removal of a graveyard (GY02)	Potential Impact
<ul> <li>If the grave yards can be preserved in situ, they must be demarcated with brick walls or with fences.</li> <li>The mine will remain responsible for their future unaffected existence and maintenance.</li> <li>Controlled access to these graved must exist for any relative or friends.</li> <li>If graveyards must be exhumed and relocated</li> <li>The exhumation of human remains and the relocation of graveyards are regulated by various laws, regulations and administrative procedures.</li> <li>Permission for the exhumation and relocation of human remains have to be obtained from the descendants of the deceased (if known), the National Department of Health, the Provincial Department of Health, the Provincial Department of Health, the Premier of the Province and the local police.</li> <li>The necessary permits and/or authorisations must be obtained from the SAHRA.</li> <li>A consultation process of 60 days must be adhered to for graves older than 60 years.</li> <li>A forensic archaeologist or reputed undertaker</li> </ul>	<ul> <li>If graveyards can be preserved</li> </ul>	Management Measures
When necessary		Frequency
Included in construction costs if approved by TCSA		Annual Management Cost

07-100

August 2009

		Establishment of Borrow Pits	וווו משני שרנטו ל	All other	•		Power line	Conveyor and						Activity		ALL NOW TAIL
	sites.	The possible impact on historically significant	alkas:	The possible impact on historically significant sites		line (RP02).	the construction of the conveyor line and power	The impact on coal remains from the past due to						Potential Impact		
<ul> <li>Ine area must be cordoned off.</li> <li>An archaeologist should be informed</li> </ul>	office must be informed.	<ul> <li>The mine environmental and safety and health</li> </ul>	identified, all activities in that vicinity must	historical and/or cultural importance be		significance.	has been identified with no historical	No management measures required. The site	exhumed and relocated.	involved whenever human remains are	procedures and relevant legislation must be	who is acquainted with the administrative		Management Measures		
construction	Prior and during													Frequency		
כסווצנו מכנוסוו כספני	Included in												Cost	Management	Annual	

well.

immediately to investigate and inspect the site to determine the importance. Should a grave be found, the SAHRA should be informed as

### 3.1.10 Noise

												Infrastructure	Construction of Railway line	Activity
												construction of the railway line.	Increase in the ambient noise levels due to the	Potential Impact
noise emissions from the equipment in order to	opencast pits must take into consideration the	<ul> <li>The scheduling of equipment within the</li> </ul>	condition and be maintained continuously.	<ul> <li>Equipment utilised must be in good working</li> </ul>	causing radiating noise.	<ul> <li>Install acoustic enclosures for equipment</li> </ul>	equipment;	<ul> <li>Install vibration isolation for mechanical</li> </ul>	and compressor components.	<ul> <li>Install suitable mufflers on engine exhausts</li> </ul>	be selected.	<ul> <li>Equipment with lower sound power levels will</li> </ul>	<ul> <li>Equipment</li> </ul>	Management Measures
	when necessary.	construction;	Prior and during											Frequency
	costs	construction	Included in											Annual Management Cost

All digging faces on the eastern and western

and natural shielding where necessary.

Noise barriers

spread tem out over the interface area.

During the design operations make use of the

natural topography of the area as a noise

Re-locate noise sources to areas which are less

noise sensitive, to take advantage of distance

buffer where possible.

Activity

Cost

side of the mine must have alternate overburden dumps or other means of attenuating the noise, which can be activated should the noise levels approach unacceptable levels.

- Construction hours
- Limit the hours of operation for specific equipment and mobile sources with high sound power outputs.
- Communication
- Open channel of communication should be established by the mine with the surrounding landowners.
- Develop a mechanism to record and respond to all complaints.

Pipeline, Increa

Power line, construction of the conveyors.

Conveyors The establishment of the pipeline and power line

Increase in the ambient noise levels due to the construction of the conveyors.

All other

is assumed to have a negligible significance.
Increase in the ambient noise levels due to the

construction of the siding and plant.

infrastructure

Establishment of Borrow Pits

Increase in the ambient noise levels due to the construction of the borrow pits.

07-100

### 3.1.11 Blasting

			Activity  Construction of Railway line Infrastructure
			Potential Impact Impact on surrounding properties as a result of the construction of the railway line.
will be removed from the blast area and parked at a designated site, as determined by the responsible manager.  All possible access roads will be blocked by personnel with red flags.  The mine will implement a temporary testing model during the initial blasting phase. Should the results indicate it necessary (vibrations above or on	construction areas, will be updated 24 hours prior to the blast, displaying time and date of blast. Employees and outside contractors will be informed of the blasting procedures and the associated safety measures during induction. Prior to the blasting, all vehicles and machinery	be in place to limit the impact of blasting activities on surrounding houses.  Surrounding property owners will be informed of the blasting procedures and schedules.  Scheduled blasting times will be planned in advance and will be clearly indicated in the mining area. Blasting boards, at the access routes to	Management Measures  Prior to the commissioning of any blasting activities, the blast team needs to assess the blasting schedules. The blasting schedules need to
	Prior and during construction		
	Included in construction costs		

07-100

August 2009

Activity

### Potential Impact

## Management Measures

by the temporary seismic monitoring stations will be implemented in order to establish whether any be equipped with permanent seismic monitoring activities. The areas of most influence as identified potential impact could result due to the blasting impact level), permanent monitoring stations will

vibrations. produced by habitation and ground motion-induced micrometer changes in crack width and those sensor that measures both weather-induced property owners. These monitors employ a single be undertaken if it is requested by surrounding Installation of electronic crack monitors will also

communication in order to ensure that all issues The mine will establish an open channel of and concerns are known and are addressed.

Impact on surrounding properties as a result of See for construction of railway line.

Pipeline,

Power line, the construction of the pipeline, power lines

Conveyors and conveyors.

other Impact on surrounding properties as a result of See for construction of railway line.

infrastructure the construction of all other infrastructure

August 2009

Page 3-52

07-100

Prior and during construction costs

Included in

construction

Activity

Potential Impact

Management Measures

Establishment of Borrow Pits

Impact on surrounding properties as a result of See for construction of railway line.

establishment of borrow pits.

07-100

August 2009

### 3.1.12 Visual

Construction of Railway line Infrastructure	Activity
Visual impact from construction activities at the railway line.	Potential Impact
<ul> <li>Very little mitigation is possible.</li> <li>Avoid construction with bright colours with high reflection values. Grey to olive green colours in a matt finish contribute to the assimilation of features with natural backgrounds.</li> <li>The minimum amount of existing flora and topsoil will be removed from the construction sites.</li> <li>Ensure, wherever possible, that all existing natural flora is retained and incorporated into the site design.</li> </ul>	Management Measures
Prior and during construction	Frequency
Included in construction costs	Annual Management Cost

August 2009

07-100

Page 3-54

Ensure that lights are positioned in such a

manner as to not create a nuisance to

surrounding landowners and night life.

similar product to reduce water usage and dust

creation.

During construction and operation, haulage

roads will be treated with Dust-a-side or a

Activi	
₹	
Potential Impact	
Management Measures	
Frequency	

Cost

Management

Annual

line, pipeline, power line and conveyors. Avoid construction with bright colours with

Conveyors

Power Pipeline,

Visual impact from construction activities for the • Very little mitigation is possible.

The minimum amount of existing flora and colours in a matt finish contribute to the backgrounds. assimilation of features with natural

- Ensure, wherever possible, that all existing natural flora is retained and incorporated into topsoil will be removed from the construction
- similar product to reduce water usage and dust During construction and operation, haulage roads will be treated with Dust-a-side or a

the site design.

Ensure that lights are positioned in such a surrounding landowners and night life. manner as to not create a nuisance to

high reflection values. Grey to olive green

Prior and during construction

construction costs Included in

Activity

Potential Impact

Cost

infrastructure other Visual impact from construction activities for all • Very little mitigation is possible. other infrastructure.

 Avoid construction with bright colours with high reflection values. Grey to olive green colours in a matt finish contribute to the assimilation of features with natural backgrounds

- backgrounds.

  The minimum amount of existing flora and topsoil will be removed from the construction
- Ensure, wherever possible, that all existing natural flora is retained and incorporated into the site design.
- During construction and operation, haulage roads will be treated with Dust-a-side or a similar product to reduce water usage and dust
- Ensure that lights are positioned in such a manner as to not create a nuisance to surrounding landowners and night life.

Prior and during

construction

ng Inc

Included in construction costs

07-100

Establishment of Borrow Pits	Activity
Visual impact from establishment of the borrow pits.	Potential Impact
<ul> <li>Very little mitigation is possible.</li> <li>Avoid construction with bright colours with high reflection values. Grey to olive green colours in a matt finish contribute to the assimilation of features with natural backgrounds.</li> <li>The minimum amount of existing flora and topsoil will be removed from the construction sites.</li> <li>Ensure, wherever possible, that all existing natural flora is retained and incorporated into the site design.</li> </ul>	Management Measures
Prior and during construction	Frequency
Included in costs	Annual Management Cost

creation.

similar product to reduce water usage and dust

During construction and operation, haulage

roads will be treated with Dust-a-side or a

Contractors Lay Down Area Activity Visual impact from contractors lay down area. Potential Impact Management Measures Very little mitigation is possible. green colours in a matt finish contribute to the Avoid construction material with bright colours backgrounds. assimilation of features with natural with high reflection values. Grey to olive construction is complete. after effect of the lay down area when activities will take place as to minimize the designated mining areas or where mining The contractor's lay-down area must be kept to the minimal size. The areas must be within Frequency Prior and during Cost Annual Management

During construction and operation, haulage similar product to reduce water usage and dust roads will be treated with Dust-a-side or a natural flora is retained and incorporated into the site design.

Ensure, wherever possible, that all existing

The minimum amount of existing flora and

topsoil will be removed from the construction

construction

construction costs

Included in

Ensure that lights are positioned in such a manner as to not create a nuisance to

surrounding landowners and night life.

07-100

### 3.1.13 Socio-Economic

Changes in Population Characteristics	Activity
change	
Environmental impacts associated with an influx of people to area and the possible construction of a contractor's camp.	Potential Impact
The use of local labour should be maximised to limit the negative impact associated with this variable. Pro-active measures should be put in place by the Emalahleni Local Municipality and DCM to minimise negative impacts associated with the influx of construction workers and potential job seekers to the area.  Criminal incidents should be communicated to the workforce and mine employees to ensure a general awareness of the safety situation in the area.  Maximise the usage of local service providers. Introduce contractual obligations for contractors to	Management Measures
Prior and during construction	Frequency
Included in construction costs	Annual Management Cost

points.

townships.

Ensure safe and secure public transport access

Ensure effective safety and security measures.

If possible, do not introduce construction camps, but

accommodate any newcomers in the surrounding

use local labour as far as possible.

Activity Potential Impact Management Measures

Frequency

Annual

Management

Cost

workers temporary Inflow

(negative). buying power at construction camp (positive); Informal business trading due to presence of

Use of local labour and contractors where possible. As far as possible, the movement of construction

and spread of sexually transmitted diseases workers should be confined to the work site to avoid any potential for impact from this variable in

proximate residential areas.

contracts. Specify the conduct of contract workers in worker related management plans and employment

to the area. Develop a strategy to minimize the influx of outsiders

organisations, as well as neighbouring residents company, size of the workforce and construction should be informed of the details of the construction Before construction commences, representatives schedules. from the local authority and community-based

Construction workers should be easily identified as specific clothing and/or name tags. part of the construction team by e.g. wearing

Ensure adequate housing facilities for possible pedestrian crossing main roads, transport modes and avoid traffic related problems (increased risk of accessible distance from the proposed project to workers from outside the area. This should be within

Criminal incidents should be communicated to the

Prior and during construction

construction included in costs

	into account and mitigate these as far as possible.	into account a								institutional
	surrounding communities and landowners	voiced by sur				<b>=</b>	expansion.	community and formation	and	community
	Possible action group formation against Construction activities should take sensitivities	Construction	against	formation	group	action	Possible	Attitude	on	Impact
	awareness of the safety situation in the area.	awareness of t								
	workforce and mine employees to ensure a general	workforce and								
Frequency	Weasures	Management Measures				Impact	Potential Impact			Activity

Cost

Management

Annual

community leaders, landowners and spokespersons. Ongoing and transparent communication with available. Local labour should be used where skills are created. No unrealistic employment expectations should be the surrounding communities and landowners. Construction schedule to be clearly communicated to into account and mitigate these as far as possible. Prior and during construction

Included in construction

costs

structures

August 2009

municipality Impact on local Increased pressure on infrastructure due to proposed in the area.

proposed expansion and other developments Municipality in terms of the service and Detailed communication and planning with the Local

Cost

Management

Annual

infrastructure needs.

contract workers and number of outside workers to Quantify the use of local labour, the needs of

be employed at any given time.

assimilated with the local IDP and LED. Additional service and infrastructure needs to be

Implement a traffic impact assessment.

Ensure safe and secure public transport access

Implement access control.

Ensure effective safety and security measures.

Monitor the condition of local roads used as transport

programmes in collaboration with the municipality. Implement road maintenance and upgrade

> Prior and during construction

> > construction included in

costs

and Community Resources	Occupational	Impacts on																Activity	
and Revenue creation	Contribution	Economic										maintenance	and	development	infrastructure	Impacts on			
during the construction phase.	businesses e.g. supplying services and materials	Economic opportunities for local and regional													infrastructure.	Increased pressure on water related		Potential Impact	
Implement contractual requirement for contractors to use local goods and services as far as possible.	possible.	Local goods and services should be used as far as	whether the demands can be met.	fed into the Electricity Master Plan to determine	Additional electricity supply requirements should be	requirements.	Municipality regarding their additional infrastructural	DCM to pro-actively liaise with the Emalahleni Local	Local Municipality together with DCM.	Such a plan should be developed by the Emalahleni	the municipal Disaster Management Plan is in place.	Ensure that a proper emergency plan that fits with	processes to ensure adequate water supply.	Municipality especially with regards to the planning	Development Plan (IDP) of the Emalahleni Local	The Expansion Project should link with the Integrated		Management Measures	
construction	Prior and during								construction	Prior and during								Frequency	
construction costs	Included in								costs	construction	Included in						Cost	Management	Annual

	Activity
Impact on Job Opportunities Impact on Property values	
by the mine. Indirect benefits to businesses.  Indirect benefits to businesses.  Indirect negative economic impacts on landowners affected by blasting.  Possible housing shortage.	Potential Impact
A skills development programme should be embarked upon before the mine is fully operation to ensure that locals are "employable".  Contractors should capacitate locals where practical. The recruitment process and policy of the mine should be widely communicated to also limit the influx of potential job seekers.  Local SMME should be allowed the opportunity to become involved in e.g. maintenance, security services, garden services, cleaning and catering services, transport services and as input suppliers.  During the construction process an equitable process should be achieved whereby minorities and previously disadvantaged individuals (women) are taken into account.  Crack surveys should be undertaken prior to and after blasting activities have taken place to determine possible damage and to eliminate misconceived perceptions regarding the impact of blasting.  Take care to implement the aspects indicated in the EMP, with a specific focus on water (surface and	Management Measures
Prior and during construction  Prior and during construction	Frequency
Included in construction costs	Annual Management Cost

underground) and dust management).

							Activity
					Procurement	Local	
					Building.	Local Economic Development and Capacity Provide support	Potential Impact
						Development	
						and	
						Capacity	
involve a	Provide o	Actively pursue local SMME links.	businesses in the area	Continue	businesses in the	Provide	Management Measures
the st	pportun	oursue lo	s in the	to pr	s in the	support	ent Mea
art of t	ities fo	ocal SM/	area	ovide	area.	•	sures
involve at the start of the procurement process and	Provide opportunities for local businesses to become	ME links.		Continue to provide technical advise to small		and encouragement to small	
process	to bec			to s		to s	
and	ome			imall		small	
		construction	Prior and during				Frequency
	costs	construction	included in	-			Annual Management Cost

Capacity Implement a skills audit and develop a skills Building and database. Ensure that contractors use local Skills Training skills, or train semiskilled people or re-skill appropriate candidates for employment purposes.

N/A

by allowing them to form part of the tender process.

07-100

Impacts Family Community And Individual, Activity Level movement daily living and patterns Impacts 9 phase. and associated impacts on local and regional Increase in traffic (construction and residential) Potential Impact roads; intrusion impacts during construction noise and dust pollution, as well as to limit any risks be carefully planned to limit any intrusion impacts, Access roads and entrances to the mining area should of accidents. Management Measures Frequency

Cost

Management

Annual

levels. Construction vehicles should adhere to the speed

that these are in good working order and not overloaded. materials and goods should be inspected to ensure Construction vehicles and those transporting

to limit transportation of these. Source material and goods locally as far as possible

ensure minimum impact. that manage construction related vehicle use to subcontractors and suppliers adhere to regulations Implement agreements to ensure that contractors,

Prior and during construction

> construction Included in

costs

Avoid busy routes, residential areas and roads past schools, churches, hospitals, etc.

Construction traffic should be diverted away from adherence to speed limits. Adhere to road safety regulations, including strict

Proactively inform municipality and local resident of roads closures and diversions. the residential areas.

enforcement agencies to ensure legal and regulatory Consultation and cooperation with local law

Page 3-66

Proactively inform municipality and local resident of

07-100

August 2009

roads closures and diversions.

	Activity
Impact on Social Networks  Networks  Health Impacts	
Long-term impact on social network.  Impact on family members that should care for ill or disabled mine workers.	Potential Impact
Contractor lay down areas should be properly managed - The EMP guidelines should be strictly adhered to.  Use local labour and contractors where possible.  As far as possible, the movement of construction workers should be confined to the work site to avoid any potential for impact from this variable in proximate residential areas.  Specify the conduct of contract workers in worker related management plans and employment contracts.  Consult with local structures and NGOs on employment matters.  Do not house construction workers on site.  Ensure sufficient safety and security measures  First aid supplies should be available at the construction camp.  Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in and nearby the construction camp.  Ensure effective monitoring of water (surface and underground) and air quality and ensure regulatory	Management Measures
Prior and during construction  Prior and during construction	Frequency
Included in construction costs  Included in construction costs	Annual Management Cost

compliance.

Activity	
Potential Impact	
Management Measures	
Frequency	

Safety Impacts Increase in crime due to opportunists taking Ongoing m advantage of situation where construction residential workers from outside the area are present in avoided.

dred.

Ongoing movement of unknown people through the residential areas or privately owned farms should be avoided.

Cost

Management

Annual

Discuss the safety and security issues, as well as construction schedule with the local community policing forum and local SAPS.

The construction area should be fenced or access to the area should be controlled to avoid animals or people entering the area without authorisation.

The construction sites should be clearly marked and "danger" and "no entry" signs should be erected.

Speed limits on the local roads surrounding the construction sites should be enforced.

The blasting "buffer zone" of 500m should be strictly

A "crack survey" should be undertaken prior to, during and after construction.

adhered to.

Findings of the "crack survey" should be clearly communicated to the affected parties.

Prior and during construction

Included in construction

costs

07-100

Management Measures	Potential Impact	Activity

patterns with movement daily living and Impacts 9 phase. and associated impacts on local and regional Increase in traffic (construction and residential) roads; intrusion impacts during construction Access roads and entrances to the site should be should be kept to a minimum.

construction of railway line

regards

6

Access roads to and from the construction sites

Cost

Management

Annual

of accidents. noise and dust pollution, as well as to limit any risks carefully planned to limit any intrusion impacts,

limits. Construction vehicles should adhere to the speed

overloaded. that these are in good working order and not materials and goods should be inspected to ensure Construction vehicles and those transporting

to limit transportation of these. Source material and goods locally as far as possible

> Prior and during construction

construction Included in

costs

## 3.2 Operational Phase

### 3.2.1 Geology

Underground	Mining of Coal Opencast	Activity
Removal of the geological coal and associated resources	Removal of the geological coal and associated resources	Potential Impact
<ul> <li>Coal resources may not only be exported but must also be supplied to ESKOM power stations to fulfill their requirements.</li> </ul>	<ul> <li>Make optimal utilisation of the coal resources which forms part of the mining rights area.</li> <li>The mining operations must remain within the</li> </ul>	Management Measures
During operational		Frequency
Included in operational costs		Annual Management Cost

### 3.2.2 Topography

	Activities	Related	Plant and RoM Stockpiles								Underground						Mining of Coal Opencast	Activity
	establishment of the RoM Stockpiles.	micro and macro topography due to the	The stockpiling of material will impact on the							underground mining operations.	Potential subsidence due to presence of			opencast operations.	and macro topography due to the construction of	of cut and fill methods will impact on the micro	The stockpiling and removal of material as result	Potential Impact
limit the potential of erosion.	<ul> <li>Ongoing rehabilitation must be undertaken to</li> </ul>	original landform as far as practically possible.	<ul> <li>Stockpiles should be shaped to resemble the</li> </ul>	safe and rehabilitated as soon as possible.	<ul> <li>Should subsidence be detected it must be made</li> </ul>	(pillars) to reduce the potential of subsidence.	undertaken by means of stabilizing infrastructure	<ul> <li>The underground mining operations must be</li> </ul>	subsidence is taking place.	surface area to determine whether any	<ul> <li>Ongoing monitoring must be undertaken of the</li> </ul>	been mined.	soon as possible after each opencast block has	<ul> <li>Progressive rehabilitation must take place as</li> </ul>	during the decommissioning phases.	exceed 18° to ensure that it could be made safe	<ul> <li>The slopes of the opencast pits should not</li> </ul>	Management Measures
	During operational						baing operational	During operational						An in Sold action in	During operational			Frequency
	operational costs	Included in					operational costs	Included in						operational costs	Included in			Annual Management Cost

		Supply	Coal F										Co-disp	Activity
			Coal Product										Co-disposal Facility	Y
		Stockpiles	Coal										ity	
		0,	Product											
	stockpiles.	macro topography due to the coal product	Product The stockpiling will impact on the micro and							to the construction of the co-disposal facility.	impact on the micro and macro topography due	material as result of operational activities will	The stockpiling, dumping and pumping of	Potential Impact
=	0	0	S	•	<b>→</b>	_	-	0	Q	а	_	-	_	Aana
limit the potential of erosion.	ngoing rehabilitation must be unde	riginal landform as far as practically p	tockpiles should be shaped to rese	established should self succession not t	facility and fertilizer and plants mu	opsoils must be place over the c	limit the potential of erosion.	Ongoing rehabilitation must be unde	as possible.	plend in with the surrounding topogra	he co-disposal facility should be	the mind on closure.	he co-disposal facility must be desi	Management Measures
mit the potential of erosion.	Ongoing rehabilitation must be undertaken to	original landform as far as practically possible.	Stockpiles should be shaped to resemble the	established should self succession not take place.	acility and fertilizer and plants must be re	Topsoils must be place over the co-disposal	imit the potential of erosion.	Ongoing rehabilitation must be undertaken to	s possible.	blend in with the surrounding topography as far	The co-disposal facility should be shaped to	he mind on closure.	The co-disposal facility must be designed with	agement Measures
mit the potential of erosion.	ngoing rehabilitation must be undertaken to		tockpiles should be shaped to resemble the	established should self succession not take place.		opsoils must be place over the co-disposal	imit the potential of erosion.	Ingoing rehabilitation must be undertaken to		plend in with the surrounding topography as far	he co-disposal facility should be shaped to	he mind on closure.	he co-disposal facility must be designed with	agement Measures Frequency

# 3.2.3 Soils Land Use and Land Capability

Coal	Activity
of Opencast	
Erosion with regards to opencast mining	Potential Impact
<ul> <li>Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.</li> <li>Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.</li> <li>Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%.</li> <li>The mine will ensure that all erosion controls are included in the designs of all linear</li> </ul>	Management Measures
During operational phase	Frequency
Included in operational costs.	Annual management Cost

implemented must be inspected on a weekly basis to determine the effectiveness.

Soil replacement and the preparation of a seedbed to facilitate the revegetation program to limit potential erodibility should be implemented. See management and monitoring

Areas where erosion control measures have been

discharge.

conveyors, pipelines etc.) and points of water

infrastructure (railway lines, power lines,

Potential Impact

Management Measures

Frequency

Annual

management Cost

recommended by specialist. programs in EMP for fertilizer usage as

- Fairly standard fertilizer treatments will be planted, and/or stockpiled for any length of crops on areas that have previously been needed for optimum agricultural production of
- Soil physical and chemical degradation as result of The nutrient status (as returned from the limited (section 7.2.3.1) added in excess. See soil utilisation guide the riverine and ground water environment if commercial fertilizers are potential pollutants to phosphorous (P) and zinc (Zn) in the form of noted that additions of potassium (K), phosphorous (P), and zinc (Zn). It should be fertilizer applications of calcium (Ca), sampling undertaken) indicates a need for

opencast mining.

- structure or the seed bank. compaction and subsequent damage to soil stockpiles will be limited to avoid soil over the undesignated mining areas and topsoil The mine will ensure that equipment movement
- Should vegetation be required, fertilizer will be applied to the topsoil stockpiles prior to vegetation.
- Vegetation establishment in disturbed areas will

During operational phase

operational costs Included in

Frequency

Annual

management Cost

and monitoring programs in EMP for fertilizer usage as recommended by specialist. being the primary constraints. See management with the growing season and water availability be undertaken as soon as practically possible,

- There will be an incident management system with incidents. including procedures and training for dealing
- Major spillage incidents will be reported to the regulatory authorities. Agriculture. Appropriate remedial measures will DME, DWAF, MDALA and the Department of be implemented in consultation with these
- If spills do occur and soils become contaminated, rehabilitated. soils, the affected areas will be landscaped and discarded at an appropriate permitted waste soils will be classified as waste and will be qualified specialist. If necessary, the polluted identified in consultation with an appropriate the appropriate remedial measures will be After the removal of the contaminated
- A detailed waste management strategy will be established and implemented.
- Best waste management practices should be emphasized during the induction phase and on

Included in

R120 000 Spill Kits operational costs.

During operational phase

07-100

Frequency

management Cost Annual

ongoing basis.

- disposal companies. Waste should be removed by licensed waste
- Should chemical toilets be utilised the sewage must be removed by a licensed company.
- The mine must adopt the cradle to grave
- Compaction is a problem to contend with if these soils are to be worked during the wet months of the year.

operations.

and their wetness factor, during mining Soil compaction due to different types of soils,

- Stockpiling of these soils should be done problems during storage. needed with the management of erosion separately from the dry soils, and greater care is
- Any strong structure that develops during the to the use of this material for rehabilitation. stockpiling stage will need to be dealt with prior

During operational phase

operational costs. Included in

07-100

Underground

Management Measures

Frequency

management Cost Annual

stockpiles, berms and adits. Erosion with regards to underground mining and the construction and upkeep of all highwalls, Vegetation establishment in disturbed areas will

Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion be undertaken as soon as practically possible.

control measures (i.e. dust allying agent,

implemented. terraces, rock cladding, etc.) must be

Erosion control measures are required on all exceeding 15%. control measures are required on all slopes slopes exceeding 2% and engineering erosion

discharge. The mine will ensure that all erosion controls are conveyors, pipelines etc.) and points of water infrastructure (railway lines, power lines, included in the designs of all linear

Areas where erosion control measures have been basis to determine the effectiveness. implemented must be inspected on a weekly

recommended by specialist. programs in EMP for fertilizer usage as seedbed to facilitate the revegetation program Soil replacement and the preparation of a implemented. See management and monitoring to limit potential erodibility should be

> During operational phase

included in

07-100

August 2009

planted, and/or stockpiled for any length of crops on areas that have previously been needed for optimage agricultural production of Fairly standard fertilizer treatments will be

operational costs.

07-100																												Activity
																									Storage	Oil and		
																										Diesel		
August 2009																									oil and diesel storage.	Soil physical and chemical degradation as result of		Potential Impact
identified in consultation with an appropriate qualified specialist. If necessary, the polluted soils will be classified as waste and will be	the appropriate remedial measures will be	<ul> <li>If spills do occur and soils become contaminated,</li> </ul>	regulatory authorities.	be implemented in consultation with these	Agriculture. Appropriate remedial measures will	DME, DWAF, MDALA and the Department of	<ul> <li>Major spillage incidents will be reported to the</li> </ul>	with incidents.	including procedures and training for dealing	<ul> <li>There will be an incident management system</li> </ul>	hydrocarbons or other chemicals are stored.	<ul> <li>MSDS sheets should be available where</li> </ul>	spill areas.	be trained in how to rehabilitate contaminated	<ul> <li>During induction and ongoing all employees must</li> </ul>	area where hydrocarbons are being utilised.	<ul> <li>Spill clean up kits should be available at each</li> </ul>	enforced.	<ul> <li>A spill contingency plan should be available and</li> </ul>	the volume stored within.	stored in bunded area with a capacity of 120% of	<ul> <li>All hydrocarbons and other chemicals should be</li> </ul>	contained area.	undertaken outside of an effectively designed	chemicals (i.e. wash bays etc.) may be	<ul> <li>No activities associated with hydrocarbons and or</li> </ul>	C	Management Measures
									biidac	phase	Distinct oppositional																	Frequency
								R120 000	Spill Kits		operational costs.	Included in															management Cost	Annual

Pot
otential Impact
Management Measures

 A detailed waste management strategy will be established and implemented

Frequency

management Cost

Annual

- Best waste management practices should be ongoing basis. emphasized during the induction phase and on
- Waste should be removed by licensed waste disposal companies.
- The mine must adopt the cradle to grave principle.

During operational Included in

phase operational costs.

	ent management system	<ul> <li>There will be an incident management system including procedures and training for dealing</li> </ul>	Generation of Soil physical and chemical degradation as result of • There will be an incident management system Mine Waste mine waste including procedures and training for dealing	Generation of :	
Frequency		Management Measures	Potential Impact		Activity

management Cost

Annual

with incidents.

- Major spillage incidents will be reported to the regulatory authorities. be implemented in consultation with these Agriculture. Appropriate remedial measures will DME, DWAF, MDALA and the Department of
- rehabilitated. soils, the affected areas will be landscaped and If spills do occur and soils become contaminated, site. After the removal of the contaminated discarded at an appropriate permitted waste soils will be classified as waste and will be qualified specialist. If necessary, the polluted the appropriate remedial measures will be identified in consultation with an appropriate
- A detailed waste management strategy will be established and implemented.
- emphasized during the induction phase and on Best waste management practices should be ongoing basis.
- Waste should be removed by licensed waste disposal companies.
- The mine must adopt the cradle to grave principle.

operational costs. Included in

During operational phase

R120 000 Spill Kits

				Hazardone Waste	
		including procedures and training for dealing	Domestic and domestic and hazardous waste	Domestic and	
		<ul> <li>There will be an incident management system</li> </ul>	Generation of Soil physical and chemical degradation as result of • There will	Generation o	
management Lost					
Annual	Frequency	Management Measures	Potential Impact		Activity

Major spillage incidents will be reported to the

DME, DWAF, MDALA and the Department of

Agriculture. Appropriate remedial measures will be implemented in consultation with these

- regulatory authorities.

  If spills do occur and soils become contaminated, the appropriate remedial measures will be identified in consultation with an appropriate qualified specialist. If necessary, the polluted soils will be classified as waste and will be discarded at an appropriate permitted waste site. After the removal of the contaminated soils, the affected areas will be landscaped and rehabilitated.
- A detailed waste management strategy will be established and implemented
- Best waste management practices should be emphasized during the induction phase and on ongoing basis.
- Waste should be removed by licensed waste disposal companies.
- Should chemical toilets be utilised the sewage must be removed by a licensed company.

Included in operational costs.

Co.ill Kits

During operational phase

Spill Kits R120 000 Chemical toilets R96 000

	Activity
	Potential Impact
<ul> <li>The mine must adopt the cradle to grave principle.</li> </ul>	Management Measures
grave	Frequency
	Annual management Cost

Sewage

sewage Soil physical and chemical degradation as result of • There will be an incident management system

with incidents. including procedures and training for dealing

- Major spillage incidents will be reported to the regulatory authorities. be implemented in consultation with these DME, DWAF, MDALA and the Department of Agriculture. Appropriate remedial measures will
- rehabilitated. soils, the affected areas will be landscaped and soils will be classified as waste and will be qualified specialist. If necessary, the polluted identified in consultation with an appropriate the appropriate remedial measures will be If spills do occur and soils become contaminated discarded at an appropriate permitted waste After the removal of the contaminated

During operational

operational costs.

Included in

phase

R120 000 Spill Kits

- A detailed waste management strategy will be established and implemented.
- Best waste management practices should be

07-100

August 2009

Frequency

Annual management Cost

emphasized during the induction phase and on ongoing basis.

- Waste should be removed by licensed waste disposal companies.
- Should chemical toilets be utilised the sewage must be removed by a licensed company.
- The mine must adopt the cradle to grave principle.

07-100

August 2009

Potential Impact

Management Measures

Frequency

Annual management Cost

storage facilities and spillages during operations

Water Storage Soil physical and chemical degradation at water • There will be an incident management system with incidents. including procedures and training for dealing

- Major spillage incidents will be reported to the regulatory authorities. be implemented in consultation with these Agriculture. Appropriate remedial measures will DME, DWAF, MDALA and the Department of
- If spills do occur and soils become contaminated, rehabilitated. soils, the affected areas will be landscaped and discarded at an appropriate permitted waste soils will be classified as waste and will be qualified specialist. If necessary, the polluted identified in consultation with an appropriate the appropriate remedial measures will be After the removal of the contaminated
- A detailed waste management strategy will be established and implemented.
- ongoing basis. emphasized during the induction phase and on Best waste management practices should be
- disposal companies. Waste should be removed by licensed waste
- The mine must adopt the cradle to grave principle.

operational costs. included in

**During operational** phase

Spill Kits

R120 000

																							Activities	Related	Plant and RoM Stockpiles	municy	Activity
																								RoM stockpiles and spillages during operations	Soil physical and chemical degradation as result of	- Occurrat impact	Potential Impact
principle.	The mine must adopt the cradle to grave	disposal companies.	<ul> <li>Waste should be removed by licensed waste</li> </ul>	ongoing basis.	emphasized during the induction phase and on	<ul> <li>Best waste management practices should be</li> </ul>	established and implemented.	<ul> <li>A detailed waste management strategy will be</li> </ul>	rehabilitated.	soils, the affected areas will be landscaped and	site. After the removal of the contaminated	discarded at an appropriate permitted waste	soils will be classified as waste and will be	qualified specialist. If necessary, the polluted	identified in consultation with an appropriate	the appropriate remedial measures will be	<ul> <li>If spills do occur and soils become contaminated,</li> </ul>	regulatory authorities.	be implemented in consultation with these	Agriculture. Appropriate remedial measures will	DME, DWAF, MDALA and the Department of	<ul> <li>Major spillage incidents will be reported to the</li> </ul>	with incidents.	including procedures and training for dealing	<ul> <li>There will be an incident management system</li> </ul>	management measures	Management Measures
												phase	<b>During operational</b>													i requeitly	Francisco
										K120 000	B120 000	Spill Kits	operational costs.	operational costs	in the state of th											management Cost	Annual

07-100

August 2009

		be undertaken as soon as practically possible.	5	other Buildings	
	will	<ul> <li>Vegetation establishment in disturbed areas will</li> </ul>	Workshops and Erosion with regards to workshops and buildings.	Workshops	
Annual management Cost	Frequency	Management Measures	Potential Impact		Activity

Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.

 Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.

Soil replacement and the preparation of a seedbed to facilitate the revegetation program to limit potential erodibility should be implemented.

Included in

During operational operational costs.

phase

### Potential Impact

# Management Measures

Frequency

management Cost Annual

Chemical Storage diesel and chemical storage. and

Soil physical and chemical degradation as result of • There will be an incident management system with incidents. including procedures and training for dealing

- Major spillage incidents will be reported to the regulatory authorities. be implemented in consultation with these Agriculture. Appropriate remedial measures will DME, DWAF, MDALA and the Department of
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operational costs.

Included in

During operational

phase

R120 000 Spill Kits

Salvage Yard

Erosion with regards to the selvage yard.

Potential Impact

Management Measures

Annual management Cost

Frequency

Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion

Erosion control measures are required on all control measures are required on all slopes exceeding 15%. slopes exceeding 2% and engineering erosion

The mine will ensure that all erosion controls are conveyors, pipelines etc.) and points of water infrastructure (railway lines, power lines, included in the designs of all linear

Areas where erosion control measures have been basis to determine the effectiveness. implemented must be inspected on a weekly

implemented. seedbed to facilitate the revegetation program Soil replacement and the preparation of a limit potential erodibility should be

 Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.

implemented. terraces, rock cladding, etc.) must be control measures (i.e. dust allying agent,

During operational phase

operational costs. Included in

Spill Kits

R120 000

07-100

weather events or return water dam and pollution • facilities and pipelines due to heavy rain, extreme

**Facilities** Management Water

control dam leaks...

Management Measures

Frequency

Annual

management Cost

- Erosion from slopes around water management Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.
- Where disturbed areas cannot be re-vegetated terraces, rock cladding, etc.) must be control measures (i.e. dust allying agent, during the life of operations, appropriate erosion implemented.
- slopes exceeding 2% and engineering erosion Erosion control measures are required on all exceeding 15%. control measures are required on all slopes
- The mine will ensure that all erosion controls are discharge. conveyors, pipelines etc.) and points of water infrastructure (railway lines, power lines, included in the designs of all linear
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Frequency  Frequency		soil replacement and the preparation of a seedbed		
Potential impact  Management Measures  Erosion with regards to the co-disposal facility.  Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.  Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.  Erosion control measures are required on all slopes exceeding 15%.  The mine will ensure that all erosion controls are included in the designs of all linear infrastructure (railway lines, power lines, conveyors, pipelines etc.) and points of water discharge.  Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.				
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Potential Impact  Erosion with regards to the co-disposal facility.  Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.  Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.  Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%.  The mine will ensure that all erosion controls are included in the designs of all linear infrastructure included in the designs of all linear infrastructure.		traitivaly times, power times, conveyors, pipetimes		
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Potential Impact  Management Measures  Erosion with regards to the co-disposal facility.  Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.  Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.  Erosion control measures are required on all slopes				
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Potential Impact  Management Measures  Frequency  Erosion with regards to the co-disposal facility.  Vegetation establishment in disturbed areas will be		undertaken as soon as practically possible.		
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Potential Impact  Management Measures  Frequency		Vegetation establishment in disturbed areas will be	Erosion with regards to the co-disposal facility.	Co disposal Facility
Potential Impact  Management Measures  Frequency				
Potential Impact  Management Measures  Frequency				
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			Potential impact	CLIVILY
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Potential Impact

Management Measures

Frequency

Annual

stockpiled for any length of time. areas that have previously been planted, and/or for optimum agricultural production of crops on Fairly standard fertilizer treatments will be needed

environment if added in excess. pollutants to the riverine and ground water zinc (Zn). It should be noted that additions of form of commercial fertilizers are potential potassium (K), phosphorous (P) and zinc (Zn) in the applications of calcium (Ca), phosphorous (P), and sampling undertaken) indicates a need for fertilizer The nutrient status (as returned from the limited

See soil utilisation guide (section 7.2.3.1)d.

During operational operational costs.

management Cost

Included in

phase

might occur during operations.

the co-disposal facility and possible spillages that including procedures and training for dealing with Soil physical and chemical degradation as result of There will be an incident management system incidents.

in consultation with these regulatory authorities. DWAF, MDALA and the Department of Agriculture. Major spillage incidents will be reported to the DME. Appropriate remedial measures will be implemented

areas will be landscaped and rehabilitated. removal of the contaminated soils, the affected appropriate permitted waste site. After the classified as waste and will be discarded at an specialist. If necessary, the polluted soils will be in consultation with an appropriate qualified the appropriate remedial measures will be identified If spills do occur and soils become contaminated,

established and implemented A detailed waste management strategy will be

ongoing basis. emphasized during the induction phase and on Best waste management practices should be

Waste should be removed by licensed waste disposal

The mine must adopt the cradle to grave principle.

Frequency

Annual

management Cost

During operational

phase

operational costs.

Included in

R120 000 Spill Kits

Activity		Potential Impact	Management Measures	Frequency	Annual management Cost
Coal Product Coal	Coal Product	Erosion with regards to operation phase of coal	Where disturbed areas cannot be re-vegetated		
Supply	Stockpiles	product stockpiles	during the life of operations, appropriate erosion		
			control measures (i.e. dust allying agent, terraces,		
			rock cladding, etc.) must be implemented.		
			Erosion control measures are required on all slopes		
			exceeding 2% and engineering erosion control		
			measures are required on all slopes exceeding 15%.		
			Areas where erosion control measures have been		
			implemented must be inspected on a weekly basis to		
			determine the effectiveness.		
			Soil replacement and the preparation of a seedbed		
			to facilitate the revegetation program to limit		

potential erodibility should be implemented.

Frequency

Annual

management Cost

coal product stockpiles and spillages of coal. Soil physical and chemical degradation as result of

There will be an incident management system including procedures and training for dealing with

DWAF, MDALA and the Department of Agriculture. Major spillage incidents will be reported to the DME, Appropriate remedial measures will be implemented

classified as waste and will be discarded at an specialist. If necessary, the polluted soils will be in consultation with an appropriate qualified the appropriate remedial measures will be identified areas will be landscaped and rehabilitated. removal of the contaminated soils, the affected appropriate permitted waste site. After the If spills do occur and soils become contaminated, in consultation with these regulatory authorities.

established and implemented. A detailed waste management strategy will be

ongoing basis. emphasized during the induction phase and on Best waste management practices should be

Waste should be removed by licensed waste disposal

The mine must adopt the cradle to grave principle.

During operational

operational costs. Included in

phase

Spill Kits

R120,000

Management Measures

Frequency

Annual management Cost

Rapid Load Out Erosion with regards to the rapid load out facility. Vegs Facility

 Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.

Where disturbed areas cannot be re-vegetated during the life of operations, appropriate erosion control measures (i.e. dust allying agent, terraces, rock cladding, etc.) must be implemented.

Erosion control measures are required on all slopes exceeding 2% and engineering erosion control measures are required on all slopes exceeding 15%. The mine will ensure that all erosion controls are included in the designs of all linear infrastructure (railway lines, power lines, conveyors, pipelines etc.) and points of water discharge.

Areas where erosion control measures have been implemented must be inspected on a weekly basis to determine the effectiveness.

Soil replacement and the preparation of a seedbed to facilitate the revegetation program to limit potential erodibility should be implemented. See management and monitoring programs in EMP for fertilizer usage as recommended by specialist.

During operational phase

Included in operational costs.

Potential Impact

Management Measures

Frequency

Annual

management Cost

Fairly standard fertilizer treatments will be needed for optimum agricultural production of crops on areas that have previously been planted, and/or stockpiled for any length of time.

The nutrient status (as returned from the limited sampling undertaken) indicates a need for fertilizer applications of calcium (Ca), phosphorous (P), and zinc (Zn). It should be noted that additions of potassium (K), phosphorous (P) and zinc (Zn) in the form of commercial fertilizers are potential pollutants to the riverine and ground water environment if added in excess.

See soil utilisation guide (section 7.2.3.1)d.

he During operational he phase ial

Included in operational costs.

Spill Kits R120,000

Soil physical and chemical degradation as result of spillages at rapid load out facility.

There will be an incident management system including procedures and training for dealing with incidents.

Major spillage incidents will be reported to the DME, DWAF, MDALA and the Department of Agriculture. Appropriate remedial measures will be implemented in consultation with these regulatory authorities. If spills do occur and soils become contaminated,

Included in operational costs

Spill Kits R120,000

During operational

phase

07-100

August 2009

Frequency

Annual management Cost

the appropriate remedial measures will be identified in consultation with an appropriate qualified specialist. If necessary, the polluted soils will be classified as waste and will be discarded at an appropriate permitted waste site. After the removal of the contaminated soils, the affected areas will be landscaped and rehabilitated.

A detailed waste management strategy will be established and implemented.

Best waste management practices should be emphasized during the induction phase and on ongoing basis.

Waste should be removed by licensed waste disposal companies.

Should chemical toilets be utilised the sewage must be removed by a licensed company.

The mine must adopt the cradle to grave principle.

Potential Impact

Management Measures

Frequency

management Cost Annual

Railway Line

line.

Erosion with regards to operation of the railway Vegetation establishment in disturbed areas will be undertaken as soon as practically possible.

during the life of operations, appropriate erosion rock cladding, etc.) must be implemented. control measures (i.e. dust allying agent, terraces, Where disturbed areas cannot be re-vegetated

etc.) and points of water discharge. included in the designs of all linear infrastructure The mine will ensure that all erosion controls are measures are required on all slopes exceeding 15%. exceeding 2% and engineering erosion control Erosion control measures are required on all slopes (railway lines, power lines, conveyors, pipelines

determine the effectiveness. implemented must be inspected on a weekly basis to Areas where erosion control measures have been

management and monitoring programs in EMP for potential erodibility should be implemented. See Soil replacement and the preparation of a seedbed fertilizer usage as recommended by specialist. to facilitate the revegetation program to limit

> During operational phase

> > operational costs. Included in

07-100

August 2009

Frequency

Annual

management Cost

stockpiled for any length of time. areas that have previously been planted, and/or for optimum agricultural production of crops on Fairly standard fertilizer treatments will be needed

environment if added in excess. pollutants to the riverine and ground water zinc (Zn). It should be noted that additions of applications of calcium (Ca), phosphorous (P), and sampling undertaken) indicates a need for fertilizer form of commercial fertilizers are potential potassium (K), phosphorous (P) and zinc (Zn) in the The nutrient status (as returned from the limited

See soil utilisation guide (section 7.2.3.1)d.

During operational

operational costs. Included in

phase

R120,000 Spill Kits

07-100

## 3.2.4 Ecology

		Mining of Coal	Activity
		Opencast	
Increase in alien invasive species. Due to the disturbance of the mining activities, the potential for the spreading of invasive alien plant species increase.  Erosion of Topsoil. Due to the removal of topsoil and sub-soils and the ongoing stockpiling thereof during the operational phase, the potential of soil erosion increase.	Destruction of natural habitat for fauna. The loss of vegetation will have an effect on the animal live.	Removal of all vegetation. The impact on the vegetation will be due to the increase size in the opencast area. Nearly al the vegetation to be impacted are grasses that are growing on disturbed sites or invader weeds	Potential Impact
A plan to eradicate al invasive alien species must be established on site  Dust must be suppressed by using a dust suppression method. Revegetation of area if exposed for longer than 18 months	It is likely that the animals will move to the surrounding areas when mining activities start. The animals will move back once mining activities have ceased and rehabilitation has taken place.	Impact on the vegetation could be mitigated if a roll over method is used during opencast mining. Revegetate backfilled areas as soon as possible after mining with the main grass species	Management Measures
During operational phase  During operational phase	During operational phase	During operational phase	Frequency
Included in operational costs.	Included in operational costs.	Included in operational costs.	Annual Management Cost

Frequency

Annual

Management Cost

Windblown dust from the conveyor transportation, stockpiles, co-disposal facility and from the opencast pit could prohibit the photosynthesis process in plants. This could cause reduced growth rates and plant vigour.

Dust must be suppressed by using a dust suppression method. Dumps should be revegetated to decrease the amount of dust.

A dust management plan that includes some of the following mitigation measures must be implemented on the mine:

Water sprays must be used in the loading of stockpiles (50% reduction).

Variable height in stackers should also be implemented (25% reduction.

Telescoping chute with water sprays could reduce the emission by 75%.

Should emissions continue to exceed the guidelines the enclosure to the loading stockpiles should be investigated.

Where vehicles are used the limited of vehicle speeds, especially during high risk periods of high winds, high temperature and low humidity should be enforced.

Erosion control measures should be employed and maintained at all dumps and stockpiles.

Ongoing ambient and PM10 monitoring must be implemented with dust monitors concentrated to the wets of the site.

During operational phase

Included in operational costs.

		Infrastructure	Related	Mining	Activity
				Conveyors	
rates and plant vigour.	process in plants. This could cause reduced growth	opencast pit could prohibit the photosynthesis the amount of dust	stockpiles, co-disposal facility and from the	Windblown dust from the conveyor transportation,	Potential Impact
		the amount of dust.	stockpiles, co-disposal facility and from the method. Dumps should be revegetated to decrease	Windblown dust from the conveyor transportation, Dust must be suppressed by using a dust suppression	Management Measures
	phase	During operational			Frequency
	operational costs.	Included in			Annual Management Cost

### Potential Impact

# Management Measures

#### Frequency

#### Management Cost Annual

Storage Oil and Diesels Avoid unnecessary impacts on the flora and fauna.

No activities associated with hydrocarbons and or outside of an effectively designed contained area. chemicals (i.e. wash bays etc.) may be undertaken

volume stored within. stored in bunded area with a capacity of 120% of the All hydrocarbons and other chemicals should be

enforced. A spill contingency plan should be available and

where hydrocarbons are being utilised. Spill clean up kits should be available at each area

During induction and ongoing all employees must be trained in how to rehabilitate contaminated spill During operational

or other chemicals are stored. Contain the impacts materials from the area. No littering. No spills. to the smallest areas and remove all foreign MSDS sheets should be available where hydrocarbons

including procedures and training for dealing with There will be an incident management system

in consultation with these regulatory authorities. DWAF, MDALA and the Department of Agriculture. Major spillage incidents will be reported to the DME, Appropriate remedial measures will be implemented

> operational costs. Spill controls Included in

phase

		Activity
Generation of Domestic and Hazardous Waste	Mine Waste	
Avoid unnecessary impacts on the flora and fauna resulting from the generation of mine waste.  Avoid unnecessary destruction of fauna and flora from resulting impacts of improper domestic and hazardous waste handling procedures.	stockpiles, co-disposal facility and from the opencast pit could prohibit the photosynthesis process in plants. This could cause reduced growth rates and plant vigour.	
Contain the impacts to the smallest areas and remove all foreign materials from the area.  Avoid all spills or incidents with mine waste.  There will be an incident management system including procedures and training for dealing with incidents.  Contain the impacts to the smallest areas and remove all foreign materials from the area.  Avoid littering around site, remove all waste from site through proper waste management procedures.  Avoid all spills or incidents regarding domestic and hazardous waste.  There will be an incident management system	Dust must be suppressed by using a dust suppression method. Dumps should be revegetated to decrease the amount of dust.	Management Measures
During operational phase  During operational phase	During operational phase	Frequency
Included in operational costs.  Included in operational costs.	Included in operational costs.	Annual Management Cost

incidents.

including procedures and training for dealing with

07-100																		ACTIVITIES	Kelateo	and	52							Activity
																				RoM Stockpiles						bewage		
August 2009																rates and plant vigour.	process in plants. This could cause reduced growth	opencast pit could prohibit the photosynthesis	stockpiles, co-disposal facility and from the	Windblown dust from the conveyor transportation,						Avoid unnecessary impacts on the flora and fauna.		Potential Impact
Page 3-106	Erosion control measures should be employed and	enforced.	winds, high temperature and low humidity should be	speeds, especially during high risk periods of high	Where vehicles are used the limited of vehicle	investigated.	the enclosure to the loading stockpiles should be	Should emissions continue to exceed the guidelines	the emission by 75%.	Telescoping chute with water sprays could reduce	implemented (25% reduction.	Variable height in stackers should also be	stockpiles (50% reduction).	Water sprays must be used in the loading of	on the mine:	following mitigation measures must be implemented	A dust management plan that includes some of the	the amount of dust.	method. Dumps should be revegetated to decrease	Dust must be suppressed by using a dust suppression	incidents.	including procedures and training for dealing with	There will be an incident management system	littering. No spills.	remove all foreign materials from the area. No	Contain the impacts to the smallest areas and		Management Measures
										phase	During operational												phase	During operational				Frequency
									R432 000	Dust suppression	operational costs.	Included in										R96 000	<b>Chemical Toilets</b>	operational costs.	Included in		Management Cost	Annual

Appropriate remedial measures will be implemented in consultation with these regulatory authorities.

DWAF, MDALA and the Department of Agriculture.

Co-disposal Facility	Water Management Facilities pipeline	Salvage Yard	Activity
	and .		
Increase in alien invasive species. Due to the disturbance of the mining activities, and all other infrastructure, the potential for the spreading of invasive alien plant species increase.	Avoid unnecessary destruction of fauna and flora from resulting impacts of improper water management facility and pipeline management procedures.	Avoid unnecessary destruction of fauna and flora from resulting impacts of improper upkeep of salvage yard	Potential Impact
incidents. A plan to eradicate al invasive alien species must be established on site	Contain the impacts to the smallest areas and remove all foreign materials from the area. No littering. No spills.  There will be an incident management system including procedures and training for dealing with	Contain the impacts to the smallest areas and remove all foreign materials from the area. No littering. No spills.  There will be an incident management system including procedures and training for dealing with incidents.	Management Measures
During operational phase	During operational phase	During operational phase	Frequency
Included in operational costs.	Included in operational costs.	Included in operational costs.	Annual Management Cost

												Supply	Coal Product	Activity	
												Stockpiles	Coal Pro		
									rates	proc	open	stoch	Product Wind	Pote	
									rates and plant vigour.	process in plants. This could cause reduced growth	opencast pit could prohibit the photosynthesis	stockpiles, co-disposal facility and from the	Windblown dust from the conveyor transportation,	Potential Impact	
the enclosure to the loading stockpiles should be	Should emissions continue to exceed the guidelines	the emission by 75%.	Telescoping chute with water sprays could reduce	implemented (25% reduction.	Variable height in stackers should also be	stockpiles (50% reduction).	Water sprays must be used in the loading of	on the mine:	following mitigation measures must be implemented	A dust management plan that includes some of the	the amount of dust.	method. Dumps should be revegetated to decrease	Dust must be suppressed by using a dust suppression	Management Measures	
	phase	<b>During operational</b>												Frequency	
R432 000	Dust suppression	operational costs.	Included in											Annual  Management Cost	

the wets of the site.

Ongoing ambient and PM10 monitoring must be implemented with dust monitors concentrated to

maintained at all dumps and stockpiles.

Erosion control measures should be employed and

Where vehicles are used the limited of vehicle speeds, especially during high risk periods of high winds, high temperature and low humidity should be

investigated.

enforced.

	Activity
Railway Line	
Increase in alien invasive species. Due to the disturbance of the mining activities, and all infrastructure, including the railway line, the potential for the spreading of invasive alien plant species increase.	Potential Impact
Increase in alien invasive species. Due to the A plan to eradicate al invasive alien species must be Ongoing disturbance of the mining activities, and all established on site infrastructure, including the railway line, the potential for the spreading of invasive alien plant species increase.	Management Measures
Ongoing	Frequency
Included in operational costs R180 000	Annual Management Cost

## 3.2.5 Surface Water

			Mining of Coal Opencast	Activity
PIT 2 of the opencast mining area will impact on a non-perennial stream that is flowing through the current area where the planned activities will take place.	Increase dust could lead to lead to the contamination of watercourses	Potential for an increase in erosion could lead to the siltation of watercourses.	Pollution of surface water resources.	Potential Impact
Clean and dirty water systems must be maintained to ensure that it remains effective.  The clean and dirty water systems must be kept in good conditions to ensure that the river diversion and the artificial route that will be layed out for the river, will be efficient, and that there will be no further negative effects on the diverted river.	Roads, topsoils and subsoils will be sprayed with a dust allaying agent.  Ongoing rehabilitation and the maintenance of erosion control measures must be undertaken to reduce the possibility of erosion.	Clean and dirty water systems must be maintained to ensure that it remains effective.  Ongoing rehabilitation and the maintenance of erosion control measures must be undertaken to reduce the possibility of erosion.	Runoff that is captured in the opencast pits should be contained in the lined pollution control dams.  Water could be utilised for dust suppression should the quality be acceptable.	Management Measures
During operational phase	During operational phase	During operational phase	During operational phase	Frequency
Included in operational costs.	Included in operational costs R432 000.	Included in operational costs.	Included in operational costs.	Annual Management Cost

						Infrastructure	Related	Mining	Activity
								Conveyors	
							pollution of the surrounding watercourses.	Spillages of coal could impact lead to the	Potential Impact
should be in place to rehabilitate the situation.	Should water contamination be detected measures	ensure that no water contamination is taking place.	Ongoing water monitoring must be undertake to	come into contact with watercourses.	should be ii place to ensure that no spillages could	the conveyors should be either enclosed or measures	Where conveyors cross wetland and drainage line	Dirty water catchments must be as small as possible.	Management Measures
			phase	During operational					Frequency
			operational costs.	Included in					Annual Management Cost

Frequer	Management Measures	Potential Impact	Activity

Annual

Management Cost

Spillages and the incorrect storage of diesels and chemicals could lead to the contamination of chemicals (i.e. washbays etc.) may be undertaken No activities associated with hydrocarbons and or outside of an effectively designed contained area.

Storage Oil and

water courses

Diesel

volume stored within. stored in bunded area with a capacity of 120% of the All hydrocarbons and other chemicals should be

enforced. A spill contingency plan should be available and

where hydrocarbons are being utilised Spill clean up kits should be available at each area

During induction and ongoing all employees must be trained in how to rehabilitate contaminated spill

and training for dealing with incidents. incident management system including procedures or other chemicals are stored. There will be an MSDS sheets should be available where hydrocarbons

in consultation with these regulatory authorities. Appropriate remedial measures will be implemented DWAF, MDAL and the Department of Agriculture Major spillage incidents will be reported to the DME

in consultation with an appropriate qualified classified as waste and will be discarded at an specialist. If necessary, the polluted soils will be the appropriate remedial measures will be identified If spills do occur and soils become contaminated

> During operational phase

Spill Kits R120 000 operational costs. Included in

Activity	
Ť	

Potential Impact

Management Measures

Frequency

Annual

Management Cost

appropriate permitted waste site. After the removal of the contaminated soils, the affected areas will be landscaped and rehabilitated.

A detailed waste management strategy will be established and implemented

			Activity
	Facilities	Generation of Domestic and Hazardous Waste Sewage	
		n of and Waste	
runoff will be reduced.	contamination of watercourses should these overflow or be unlined.  Due to the containment of dirty water, the water	The incorrect disposal of domestic and hazardous waste could lead to the contamination of watercourses.  Spillages could lead to the contamination of water courses  Dirty water stored on site could contribute to the	Potential Impact
possible.  Polluted water at the bottom of the stockpiles must be captured and pumped to the pollution control dams.  Effective clean and dirty water systems must be	1:50 year storm event, with additional capacity for emergency preparedness.  Secondary containment (i.e. bunded areas) must be available for emergency preparedness measures.  Operation of dams and associated infrastructure must be carried out under the supervision of a Professional Civil Engineer registered under the Engineering profession of South Africa.  Dirty water catchments must be kept as small as	A comprehensive waste management plan must be available and enforced on site.  Best waste management practices should be emphasized during the induction phase and on ongoing bases.  Waste should be removed by licensed waste disposal companies.  Should chemical toilets be utilised the sewage must be removed by a licensed company.  The mine must adopt the cradle to grave principle.  All dirty water storage areas must be designed for a	Management Measures
During operational phase	During operational phase	During operational phase	Frequency
Included in operational costs. Surface water monitoring R50 000	Included in operational costs.	Included in operational costs.	Annual Management Cost

maintained.

Annual

Management Cost

Activity	Pot	Potential Impact	Management Measures	Frequency
			Ongoing rehabilitation must be undertaken to reduce the potential of erosion.	
			Ongoing water monitoring must be undertaken to	
			determine the impact of the mining infrastructure	
			on the surrounding watercourses.	
			Should it be found that pollution is taking place the	
			mine must implement measures to rehabilitate the	
			situation.	
Plant and RoM Stockpiles		The fine material from the coal stockpiles can be		
Related	trar	transported to watercourses and lead to the		

Salvage Yard contamination of water courses and old equipment could lead Spillages and the incorrect storage of machinery A clear material separation guide should be to the available at the storage area. Records of the inflows and outflows should be

Activities

contamination thereof.

stored in bunded area with a capacity of 120% of the volume stored within. All hydrocarbons and other chemicals should be During operational

available at all times.

enforced. A spill contingency plan should be available and

where hydrocarbons are being utilised. Spill clean up kits should be available at each area

> operational costs. Included in

R120 000 Spill Kits

phase

			Facility	Rapid Load Out														Supply Stockpiles	Coal Product Coal Product			Co disposal Facility	Activity	
			pollution of the surrounding watercourses.	Spillages of coal could impact lead to the													contamination thereof.	transported to watercourses and lead to the	The fine material from the coal stockpiles can be		contamination thereof.	The fine material from the coal stockpiles can be transported to watercourses and lead to the	Potential Impact	
the potential of erosion.	Ongoing rehabilitation must be undertaken to reduce	maintained.	Effective clean and dirty water systems must be	Dirty water catchments must be as small as possible.	situation.	mine must implement measures to rehabilitate the	Should it be found that pollution is taking place the	on the surrounding watercourses.	determine the impact of the mining infrastructure	Ongoing water monitoring must be undertaken to	the potential of erosion.	Ongoing rehabilitation must be undertaken to reduce	maintained.	Effective clean and dirty water systems must be	dams.	be captured and pumped to the pollution control	Polluted water at the bottom of the stockpiles must	possible.	Dirty water catchments must be kept as small as	captured and pumped to the pollution control dams.	Polluted water at the bottom of the dumps must be	Ongoing rehabilitation must be undertaken to ensure that no erosion of the side slopes take place.	Management Measures	
	pilase	paring operational	During operational									phase	During operational								During operational		Frequency	
Groundwater,	monthly	Surface water	operational costs.	Included in								onerational costs	Included in								Included in		Annual Management Cost	

													Activity
						Railway Line							
					pollution of the surrounding watercourses.	Spillages of coal could impact lead to the							Potential Impact
ensure that no water contamination is taking place.	Ongoing water monitoring must be undertake to	spillages could come into contact with watercourses.	measures should be in lace to ensure that no	line the conveyors should be either enclosed or	Where the railway line cross wetland and drainage	Dirty water catchments must be as small as possible.	situation.	mine must implement measures to rehabilitate the	Should it be found that pollution is taking place the	on the surrounding watercourses.	determine the impact of the mining infrastructure	Ongoing water monitoring must be undertaken to	Management Measures
	phase	<b>During operational</b>											Frequency
	operational costs.	Included in										quarterly	Annual Management Cost

Should water contamination be detected measures should be in place to rehabilitate the situation.

## 3.2.6 Groundwater

Mining of Coal	~
Underground Mining	
Dewatering of the aquifers due to the mine dewatering.	Potential Impact
The ongoing monitoring and reporting programme must be followed. The ongoing reporting on groundwater levels must be undertaken throughout all stages of the project. If water quality or quantity is impacted on by the mine, water must be supplied to water users, if the groundwater study proofs that the mine is impacting on the groundwater. Water must be of similar quality used prior to the mining activities. Clean and dirty water systems must be maintained to ensure that it remains effective.	Management Measures
During operational phase	Frequency
Included in operational costs. Groundwater monitoring R100 000	Annual Management Cost

aquifers.

good conditions to ensure that aquifers will not be polluted by dirty water, and that there will be no further negative effects on the groundwater

07-100										groundwater level recovery rate.	Decrease in the TNC groundwater level recover	Decrease in the TNG groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNI groundwater level recov	Decrease in the TNG groundwater level recov	Decrease in the TNI groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNI groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNO groundwater level recov	Decrease in the TNO groundwater level recovery	mined-out areas.  Decrease in the TNO groundwater level recovers.	Contamination of surro mined-out areas.  mined-out areas.  Decrease in the TNA groundwater level recovers.	Contamination of surre mined-out areas.  mined-out areas.  Decrease in the TNG groundwater level recovers the tree of the tree	Contamination of surre mined-out areas.  Mined-out areas.  Decrease in the TNG groundwater level recovers.	Activity  Contamination of surremined-out areas.  Decrease in the TNI groundwater level recovery and the transmitted of the tra
2000	impacting on the groundwater. Water must be of	the groundwater study proofs th	mine, water must be supplied to water likers if	If water quality or quantity is impacted on by the	with DWAF and surrounding groundwater users.	than this figure discussions must be entered into	Should the extraction of groundwater be more	back into the TNC mine.	very rate. must always be smaller than the recharge figures	IC underground workings Ensure that the amount of water that is extracted	aquifers.	further negative effects on th	polluted by dirty water, and that there will be no	good conditions to ensure that aquifers will not be	The clean and dirty water systems must be kept in	to ensure that it remains effective.	Clean and dirty water systems must be maintained	similar quality used prior to the mi	impacting on the groundwater. Water must be of	the groundwater study proofs that the mine is	mine, water must be supplied to water users, if	If water quality or quantity is impacted on by the	throughout all stages of the project.	groundwater levels must be	must be followed. The ongoing reporting on	Contamination of surrounding groundwater from The ongoing monitoring and reporting programme			Management Measures	
	ater must be of	at the mine is	water lisers if		phase	During operational			recharge figures	that is extracted		effects on the groundwater	there will be no	uifers will not be	must be kept in	200000		prior to the mining activities. phase	During operational			pacted on by the	CEL	be undertaken	ng reporting on	rting programme		Management Cost	Frequency	

Annual

Management Cost

Co disposal Facility Activity Potential Impact similar quality used prior to the mining activities. Management Measures Frequency

Contamination of surrounding groundwater from Management measures must be put in place to

the co-disposal facility.

stockpile and the RoM stockpiles. disposal facility, also under the coal-product reduce seepage through the base of the co-

groundwater levels must must be followed. The ongoing reporting on throughout all stages of the project. The ongoing monitoring and reporting programme be undertaken

to ensure that it remains effective. Clean and dirty water systems must be maintained similar quality used prior to the mining activities. impacting on the groundwater. Water must be of the groundwater study proofs that the mine is mine, water must be supplied to water users, if If water quality or quantity is impacted on by the

aquifers. good conditions to ensure that aquifers will not be further negative effects on the groundwater polluted by dirty water, and that there will be no The clean and dirty water systems must be kept in

> operational costs. Groundwater monitoring Included in

R100 000

During operational

phase

August 2009

07-100

Page 3-121

## 3.2.7 Wetlands

Activity	Coal	
	of	
	of Opencast	
Potential Impact	Loss of wetland vegetation and destruction of wetland habitat  Increased sediment movement off the site due to erosion on bare soil surfaces and increased sediment load in the valley bottoms.	
Management Measures	Loss of wetland vegetation and destruction of Opencast operations should remain within the authorised boundaries of the mining operations.  All activities must remain within the dedicated footprints of the infrastructure within the mining area.  All infrastructure associated with the opencast pits should be located outside the wetland boundaries as far as is practically possible.  Increased sediment movement off the site due to a low berm, approximately 1m high by 2-3m wide must be established prior to the commencement of opencast opencast opencast opencast workings and the valley bottom wetlands, and where possible outside the wetland boundary, to intercept flows containing suspended soils and	
Frequency	During operational phase	
Annual Management Cost	Included in operational costs.	

create a depositional environment.

	Activity
Soil compaction in areas traversed by heavy All activities must machinery footprints of the inf	Potential Impact
All activities must remain within the dedicated footprints of the infrastructure within the mining area.	Management Measures
	Frequency
	Annual Management Cost

far as is practically possible.

Where compaction is evident, ongoing ripping must be undertaken to break up the compacted soil surface.

Should self succession of vegetation not take place, the area must be re-vegetated.

During operational phase

should be located outside the wetland boundaries as

All infrastructure associated with the opencast pits

Included in operational costs.

August 2009