ENVIRONMENTAL & ENGINEERING

REPORT

TRENTRA (PTY) LTD

BASIC ASSESSMENT REPORT FOR MINING PERMIT APPLICATION – REF: MP 30/5/1/1/3/11815 MP

REPORT REF: 19-976-AUTH-REP _11815MP

IN RESPECT OF A PORTION OF THE REMAINING EXTENT OF THE FARM VLAKLAAGTE 45 IS, EMALAHLENI LOCAL MUNICIPALITY, MPUMALANGA

VERSION 1.0

Document and Quality Control:

Document No:	19-788-AUTH DRAFT BAR			
AA – draft	25/09/2020	Riana Panaino		First draft for review / comments
BB – draft	28/09/2020	Vernon Siemelink		Technical Review
CC– draft		Leoni le Roux		Quality review
Approved for Distribution:				
0.0	28/09/2020	Vernon Siemelink		Final report
1.0	14/05/2021	Riana Panaino		2nd round of Public Review after DMR comments

Quality Control by:

Nature of Signoff:	Responsible Person:	Role / Responsibility	Qualification
Author	Riana Panaino	Environmental Assessment Practitioner	BSc Honns Biodiversity and Conservation
Technical Reviewer	Vernon Siemelink	Environmental Assessment Practitioner	M(EnvMan) UP – Senior Environmental Consultant
Quality Reviewer	Leoni le Roux	Project Administration	Professional Secretary and Personal Assistant

DISCLAIMER:

This is a legally binding document and many of the actions and recommendations remain the responsibility of the client (as the owner/lessee of the property).

EAP - was independent and performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application; have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity; ensure compliance with these Regulations;

Take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing-

The findings, results, observations, conclusions and recommendations provided in this report are based solely on the information provided to Eco Elementum (Pty) Ltd by the Client and other external sources (including previous site investigation data and external scientific studies). The opinions expressed herein apply to the site conditions and features which existed at the time of commencement of the investigations and production of this report.

The author has utilised his/her best scientific and professional knowledge in preparing this report and the content herein contained is and remains confidential in nature, save where otherwise ordered by a Court of law.

Whilst Eco Elementum (Pty) Ltd exercises due care and diligence in rendering the services and preparing this report, the accuracy of the content herein contained is reliant on the accuracy, correctness and completeness of information and/or data supplied to it by the Client. In this regard, Eco Elementum (Pty) Ltd accepts no liability for any loss and/or damages arising out of the inaccuracy of this report in instances where the information and/or data provided to it by the Client is found to be inaccurate, incorrect and/or incomplete.

EXECUTIVE SUMMARY

Background

Trentra (Pty) Ltd applied for a Mining Permit of coal to the Regional Department of Mineral Resources ("DMR" Mpumalanga) in respect of the Remaining Extent of the farm Vlaklaagte 45 IS in the eMalahleni Local Municipality, Mpumalanga, South Africa. The study area is located roughly 15km Northeast of Kriel.

Table 1.1: Basic Assessment Timeline followed

Date	Basic Assessment timeline
N/A	Mining Permit Application on SAMRAD
10/02/2020	Acceptance received from DMR
28/08/2020	30 day Public Participation started for the NEMA Basic Assessment Process
28/09/2020	Submission of the final Basic Assessment Report
03/05/2021	Comments received from the DMR
14/05/2021	2nd round of 30 day Public Review
15/06/2021	Resubmission to the DMR

The obtaining of a Mining Permit from the Department of Mineral Resources is governed by the Mineral Petroleum Resources Development Act (MPRDA, no 28 of 2002). The MPRDA requires compliance with related legislation, specifically the National Environmental Management Act of 1998 (NEMA). This Basic Assessment Report includes, amongst others, the following information as required in terms of the NEMA:

- A description of the environment likely to be affected by the proposed prospecting activities;
- An assessment of potential impacts on the environment, socio-economic conditions, and cultural and heritage aspects;
- A summary of the potential significance of identified impacts;
- Proposed mitigation and management measures to minimise adverse impacts and to optimise benefits; and
- Planned monitoring and performance assessment of the EMP and Rehabilitation measures of areas disturbed during prospecting.

Project Schedule

The BA process should be undertaken for project activities that are included under Listing Notices 1 and 3. Impacts of these activities are more generally known and can often be mitigated or easily managed. The BA process is generally shorter and less onerous than the S&EIR process. The BA process must follow the procedure as prescribed in Regulations 19 to 20.

Registered Landowner

The registered owners of the farms were listed as follows:

Table 1.2: Directly affected landowners

	Landowner	Farm Portion
1.	DORSTFONTEIN COAL MINES PTY LTD	In respect of the remaining extent of the farm Vlaklaagte 45 IS

Surrounding landowners who were contacted are listed below:

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Farm List

Date Requested	2020/04/24 10:43
Deeds Office	MPUMALANGA
Registration Division	IS
Farm Name	-
Farm Number	45
Remaining Extent	NOT SELECTED

PORTION LIST

Portion	Owner	Title Deed	Registration Date	Purchase Price (R)
0	DORSTFONTEIN COAL MINES PTY LTD	T3714/2010	2010/03/09	8 042 150
6	SOUTH32 S A COAL HOLDINGS PTY LTD	T65609/1991	1991/09/30	0
13	DORSTFONTEIN COAL MINES PTY LTD	T3714/2010	2010/03/09	8 042 150
29	SOUTH32 S A COAL HOLDINGS PTY LTD	T65609/1991	1991/09/30	0
31	SOUTH32 S A COAL HOLDINGS PTY LTD	T65609/1991	1991/09/30	0
34	ISLARDU BOERDERY CC	T131595/2002	2002/10/24	2 201 028
36	SOUTH32 S A COAL HOLDINGS PTY LTD	T29662/1991	1991/05/15	0
39	DORSTFONTEIN COAL MINES PTY LTD	T3712/2010	2010/03/09	16 279 500
48	ISLARDU BOERDERY CC	T131595/2002	2002/10/24	2 201 028
50	SOUTH32 S A COAL HOLDINGS PTY LTD	T32191/1993	1993/04/29	0

Details of the Public Participation Process followed

Section 41 of NEMA Regulation 982 set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process has and been followed at all times and is based on reciprocal dissemination of information. The following will be undertaken during the PPP:

1. Identification of Interested and Affected Parties (IAPs);
2. Notification of IAPs regarding the proposed project;
3. A public information meeting via ZOOM with IAPs, should there be interest;
4. Gathering comments, issues and concerns from IAPs;
5. Responding to IAP comments, issues and concerns;
6. Compilation and submission of results of consultation report to the DMR; and
7. Providing IAPs with the opportunity to review and comment on the basic assessment report.

Project Description

Table 1.3: Project description

Item	Detail
Type of mineral	Bituminous coal found in the coal seams of the Witbank Coal Field.
Mining method	Opencast Mining following a roll-over concurrent rehabilitation methodology.
Depth of the mineral below surface	Coal from possible two (2) coal seam horizons, Seam 4 and 5, is mined with an estimated thickness of 1 to 2m at a depth varying from 40 to 50m deep.
Geological formation	Witbank Coal Field.

Item	Detail
Mining Area Size	5 ha
Coal Reserve	It is anticipated that a maximum 30 000 tons per month of Coal will be moved / screened. No coal washing will take place on the site, only truck and haul to a nearby beneficiation plant.
Mining Permit Properties	Remaining Extent of the farm Vlaklaagte 45 IS.
Property Applicable to current application	Remaining Extent of the farm Vlaklaagte 45 IS.
Existing Authorisations	N/A
Life of mine	Trentra will have approximately thirty-six (36) months of life as determined from the proposed production rate.

Location

The study area is characterised by agricultural fields and coal mining, historic and current.

Impacts

The impacts were assessed and impacts rated as Moderate to High after mitigation or as a cumulative impact are summarised below:

Activity	Impact	Significance without mitigation	Significance with mitigation	Mitigation measures
Ecological Impacts				
Construction and operational activities	Flow alterations due to erosion and sedimentation	Med	Med	
Construction and operational activities	Pollution of watercourse	Med-High	Med	
Operational, decommissioning and rehabilitation activities.	Spread of alien vegetation	Med-High	Med	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the watercourse Erosion control measures must be employed where required.
Air Quality				
Rehabilitation	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Med	Med	Minimise exposed surface duration The area of disturbance must be kept to a minimum Avoid Dust Creation
Soils, Land Use, Land Capability and Hydropedology				
Surface clearing and preparation	Soil erosion from exposed soil surfaces	High	Med-High	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion
Surface clearing and preparation	Removal of both topsoil and subsoil horizons increase the risk of groundwater pollution	High	Med	Limit areas where soil horizons are removed to that which are essential for the construction of infrastructure
Surface clearing and preparation	Loss of pre-mining land capabilities	High	High	Mitigation measures will not be able to return the original land capabilities
Roll over mining	Soil surfaces are increasingly compacted by vehicle and equipment movement	Med-High	Med	Vehicle and equipment should only move around on haul roads and park in designated areas
Roll over mining	Soil erosion on soil stockpiles	High	Med	The slope of the topsoils stockpiles must not be more than 15% in order to limit erosion from the stockpiles.
Social Economic				

Activity	Impact	Significance without mitigation	Significance with mitigation	Mitigation measures
Mine establishment	Employment and income opportunity	Med	Med	Maximise Employment Opportunities, Skills and Enterprise Development
Mining operations	Job losses	Med-High	Med	
Mining operations	Decrease/termination of community investment funds and support to local communities	Med-High	Med	Minimise the negative economic impacts related to mine closure

Reasoned opinion

The EAP believes that the authorisation for the remaining portions of the activity should be granted.

The risks of the remaining proposed mining activity are minimal and can be mitigated by following the mitigation measures stipulated in the EMPr, which will reduce impacts significantly to acceptable levels.

Conditions that must be included in the authorisation

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted
- Methods of handling the potential decant should be investigated, approved and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- Any development must occur outside of the recommended wetland buffer zone.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An incident and complains register must be present on site and submitted to the Municipality on quarterly basis.
- The applicant must have dust fallout monitoring points around the proposed mining area, and have the monitoring reports submitted to the Municipality on quarterly basis.

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Definition of Terms

Audit	a systematic, independent and documented review of operations and practises to ensure that relevant requirements are met. Qualified professionals with relevant auditing experience should conduct audits and, where possible, independent external auditors should also be used.
Borehole	is a narrow shaft bored in the ground, either vertically or horizontally. A borehole may be constructed for many different purposes, including the extraction of water or other liquid (such as petroleum) or gases (such as natural gas), as part of a geotechnical investigation, environmental site assessment, mineral exploration, temperature measurement, as a pilot hole for installing piers or underground utilities, for geothermal installations, or for underground storage of unwanted substances, e.g. in Carbon capture and storage.
Clean Water	clean water is any water that has maintained the chemical, physical, and biological integrity of the waters by preventing point and nonpoint pollution sources.
Compliant	a full achievement of the performance requirement of a particular condition of the license or programme
Conservation	in relation to a water resource means the efficient use and saving of water, achieved through measures such as water saving devices, water-efficient processes, water demand management and water rationing;
Construction	the time period that corresponds to any event, process, or activity that occurs during the Construction phase (e.g., building of site, buildings, and processing units) of the proposed project. This phase terminates when the project goes into full operation or use.
Corrective Action Plan	an action plan developed by the proponent, contractor, or facility owner and approved by the external auditor that describes how the contractor or facility owner intends to resolve the non-conforming item. The Corrective Action Plan should be specific, measurable, achievable, realistic, and timely.
Director-General	means the Director-General of the Department;
Effluent	is defined by the United States Environmental Protection Agency as “wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall. Generally, refers to wastes discharged into surface waters”. The Compact Oxford English Dictionary defines effluent as “liquid waste or sewage discharged into a river or the sea”. Effluent in the artificial sense is in general considered to be water pollution.
Environmental Audit Report	a summary report prepared after an environmental audit that describes the attributes of the audit and the audit findings and conclusions.
Environmental Authorisation	is an environmental authorisation issued by a state department.
Environmental Component	an attribute or constituent of the environment (i.e., air quality; marine water; waste management; geology, seismicity, soil, and groundwater; marine ecology; terrestrial ecology, noise, traffic, socio-economic) that may be impacted by the proposed project.
Environmental Impact	a positive or negative condition that occurs to an environmental component as a result of the activity of a project or facility. This impact can be directly or indirectly caused by the project’s different phases (i.e., Construction, Operation, and Decommissioning).
Groundwater	is the water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. The depth at which soil pore spaces or fractures and voids in rock become completely saturated with water is called the water table. Groundwater is recharged from, and eventually flows to, the surface naturally; natural discharge often occurs at springs and seeps, and can form oases or wetlands
Non-conformance	constitutes a non-compliance or an action plan or initial actions taken without tangible deliverables. Non-conformance may also be associated with activities breaching legislation. Non-Conformance findings therefore have a high priority and mitigation measures are mandatory.
Operation	the time period that corresponds to any event, process, or activity that occurs during the Operation (i.e., fully functioning) phase of the proposed project or development. (The Operation phase follows the Construction phase, and then terminates when the project or development goes into the Decommissioning phase.)
Partially Compliant	achievement with shortcomings (such as documented proof and or work in progress) and achievement where there is an obvious shortcoming in the delivery of the performance requirement.
Pollution	is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution.
Protection	in relation to a water resource, means - (a) Maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way; (b) Prevention of the degradation of the water resource; and (c) the rehabilitation of the water resource;
Proponent	the person, company, or agency that is the primary responsible party for a development project and that is the permit applicant/holder for the project.
Rehabilitation	is the act of restoring something to its original state;
Responsible Authority	in relation to a specific power or duty in respect of water uses, means - (a) if that power or duty has been assigned by the Minister to a catchment management agency, that catchment management agency; or (b) if that power or duty has not been so assigned, the Minister;
Water Resource	includes a watercourse, surface water, estuary, or aquifer;

Wetland	means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

Abbreviations

CARA:	Conservation of Agricultural Resources Act, 43 of 1983
DEA:	Department of Environmental Affairs (The former Department of Environmental Affairs and Tourism)
DMR:	The Department of Mineral Resources (The former Department of Minerals and Energy)
DWA:	Department of Water Affairs (Is now referred to the Department of Water and Sanitation – DWS)
EA :	Environmental Authorisation
ECO:	Environmental Control Officer
EIA :	Environmental Impact Assessment
ELCA :	Environmental Legal Compliance Assessment
EMP :	Environmental Management Plan
EMPPA:	Environmental Management Programme Performance Assessment
EMPR :	Environmental Management Programme
EMS:	Environmental Management System
GM:	General Manager
GN:	Government Notice
I&AP:	Interested & Affected Parties
IEM:	Integrated Environmental Management Series
ISO:	International Standards Organisation
IWULA:	Integrated Water Use Licence Application
IWUL:	Integrated Water Use License
IWWMP:	Integrated Water and Waste Management Plan
KG:	Knowledge Gap
MOC:	Management of Change
MPRDA:	Mineral and Petroleum Resources Development Act, 28 of 2002
MR:	Mining Right
N/R:	Applicable, but not required at the time of the audit
NEMA:	National Environmental Management Act, 107 of 1998
NEMAQA:	National Environmental Management: Air Quality Act, 39 of 2004
NEMBA:	National Environmental Management: Biodiversity Act, 10 of 2004
NEMWA:	National Environmental Management: Waste Act, 59 of 2008
NC:	Non-conformance
NHRA:	National Heritage Resources Act, 25 of 1999
NWA:	National Water Act, 36 of 1998
RWD:	Return Water Dam
ROM:	Run of Mine
SAHRA:	South African Heritage Resources Authority
SHEQ:	Safety, Health, Environment and Quality
SLP:	Social and Labour Plan
SOP:	Standard Operating Procedure
SWMP:	Strategic Water Management Plan
WSA:	Water Services Act, 108 of 1997
WUL:	Water Use Licence

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL BASIC ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: **Trentra (Pty) Ltd**

TEL NO: 074 5489 726

FAX NO:

POSTAL ADDRESS: PO Box 90512
Garsfontein
0042

PHYSICAL ADDRESS: 122 Herbert Baker Street, Groenkloof, Pretoria

FILE REFERENCE NUMBER SAMRAD: **MP 30/5/1/1/3/11815 MP**

1. IMPORTANT NOTICE

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

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

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

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

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

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

a. determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
b. identify the alternatives considered, including the activity, location, and technology alternatives;
c. describe the need and desirability of the proposed alternatives,
d. through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:

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

the degree to which these impacts—

aa. can be reversed;
bb. may cause irreplaceable loss of resources; and
cc. can be managed, avoided or mitigated;

e. through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

1. identify and motivate a preferred site, activity and technology alternative;
2. identify suitable measures to manage, avoid or mitigate identified impacts; and
3. identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSSSMENT AND BASIC ASSESSMENT REPORT

3. CONTACT PERSON AND CORRESPONDENCE ADDRESS

3.a DETAILS OF

3.a.i Details of the EAP

Name of The Practitioner: Riana Panaino

Tel No.: 012 807 0383

Fax No. : 086 714 5397

e-mail address: riana@ecoe.co.za

3.a.ii Expertise of the EAP.

3.a.ii.1 The qualifications of the EAP

Name	Riana
Surname	Panaino
Company	Eco Elementum (Pty) Ltd
Position	Senior Environmental Consultant
Location	Glenfield Office Park, 361 Oberon Avenue, Faerie Glen, Pretoria
Email	riana@ecoe.co.za
Telephone Number	012 348 5214
Education	**BSc Honns Biodiversity and Conservation** University of Johannesburg, 2007
Professional skills	- Specialist Co-ordination - Project Management - Monitoring and Compliance - Compilation of Environmental Management - Compilation of Environmental Impact Assessment - Government Department Liaison - Assessment of Wetland Status and Functionality - Determination of Wetland Boundaries

Please refer to the CV attached in Appendix A.

3.a.ii.2 Summary of the EAP's past experience.

Table 3.1: Qualifications of EAP

Skills	- Environmental Impact Assessments. - Basic assessments, WULA reports.

	- Water use license application. - Prospecting and Mining Right Authorizations. - Environmental Management Plans. - Public Participation. - Environmental Authorizations.
EAP Experience	With more than 10 years' experience in the environmental consulting industry she has a firm understanding of Environmental Management. She can adapt to a wide range of working environments, has a strong problem-solving ability and work towards team and client satisfaction. Riana has a passion for Environmental Authorisation Processes (Basic Assessments, Environmental Impact Assessments, Monitoring, Environmental Management Plans, Waste Licence Applications, Closure Application and Integrated Water Use License Applications) in terms of the South African legislative regime.

3.b LOCATION OF THE OVERALL ACTIVITY.

Table 3.2: Location of the activity

Farm Name:	Remaining extent of the farm Vlaklaagte 45 IS.
Application area (Ha)	5ha
Magisterial district:	Nkangala District Municipality eMalahleni Local Municipality
Distance and direction from nearest town	15km Northeast of Kriel
21 digit Surveyor General Code for each farm portion	T0IS00000000004500000
Locality map	Attach a locality map at a scale not smaller than 1:250 000 and attach as Appendix D
Description of the overall activity. (Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaissance permit, Technical co-operation permit, Additional listed activity)	Application for Environmental Authorisation submitted in support of a Mining Permit Application in terms of the MPRDA Trentra (Pty) Ltd (Trentra) has applied for a Mining Permit in terms of the MPRDA. Trentra intends to mine coal resources on a 5ha portion of the Remaining Extent of the Farm Vlaklaagte 45 IS. The resource will be mined via opencast roll over mining. The following activities will be undertaken on site: • Box cut opencast mining with a roll over rehabilitation sequence; Hauling, access road, haul road, • Mobile offices; • Mobile sanitation and change house; • Mobile fuel storage; • Pollution control facility/dam(s); • Clean and dirty water separation system; • Topsoil, subsoil, overburden, stockpiles; • Weighbridge; A basic assessment process is required in terms of the NEMA 2014 amended regulations for the application of a Mining Permit

3.c LOCALITY MAP

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

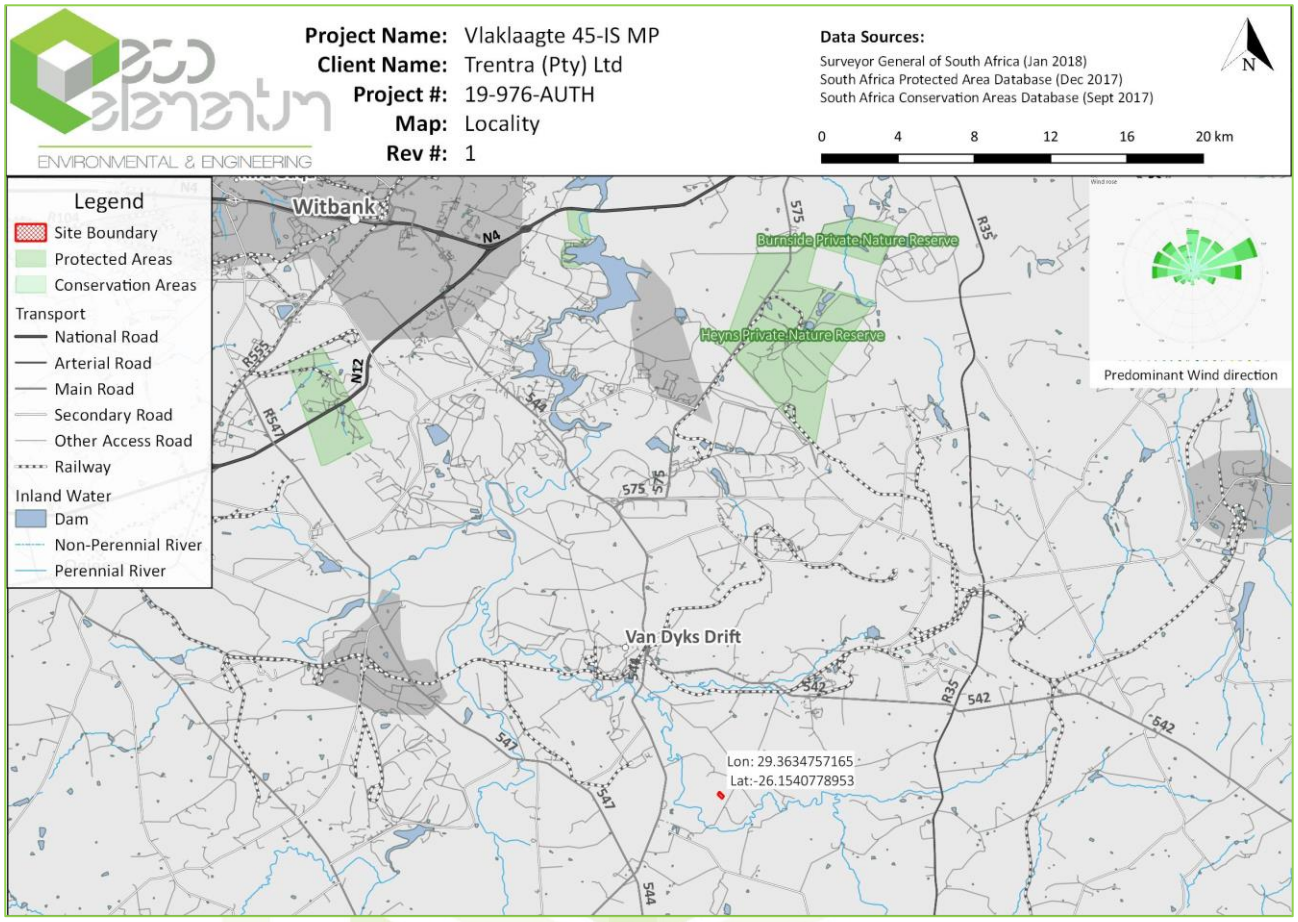


Figure 3.1: Locality Map

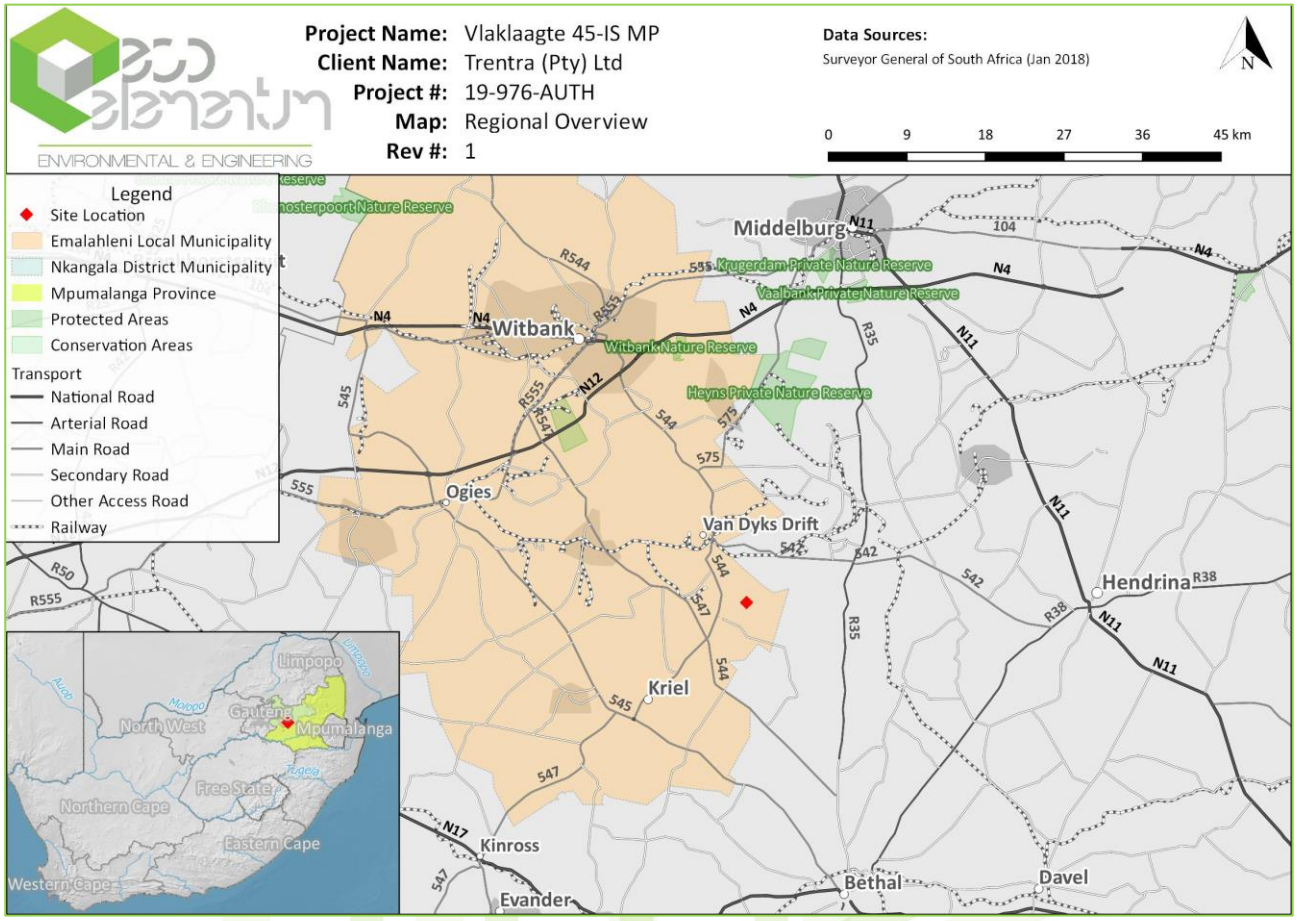


Figure 3.2: Regional and Provincial location of the study area

3.d DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

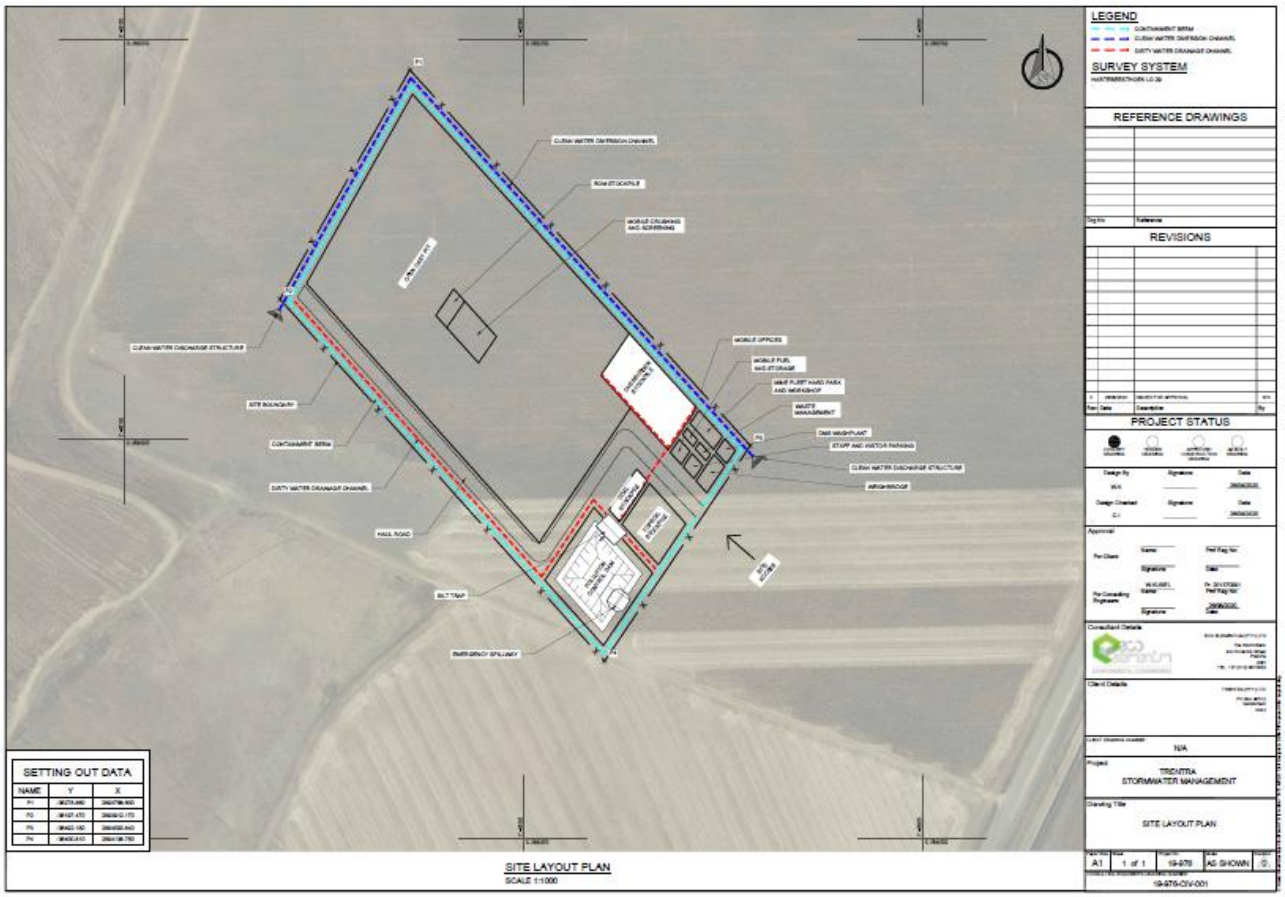
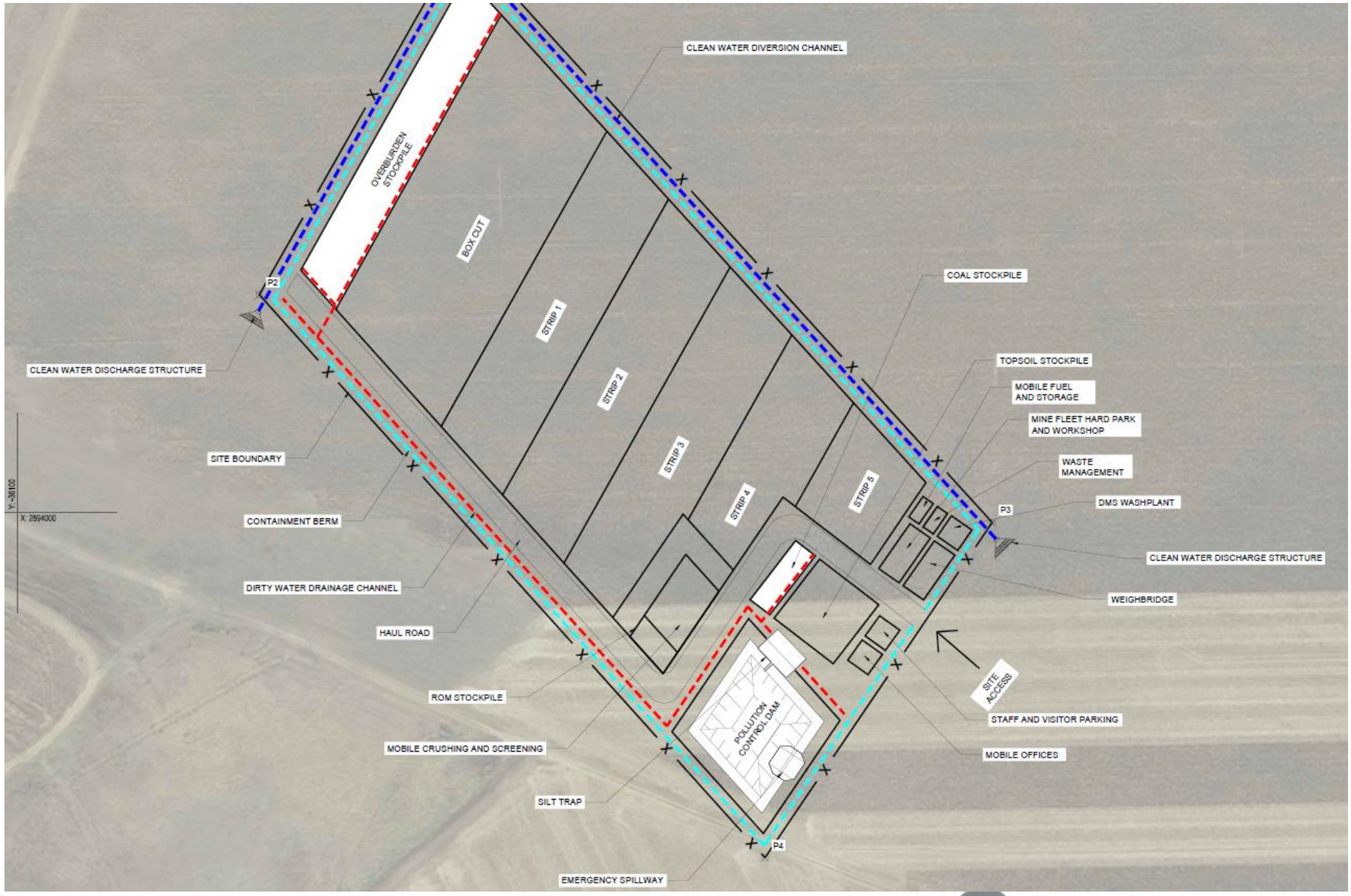


Figure 3.3: Activities Map (see next page for enlarged view)


CLEAN WATER DIVERSION CHANNEL
OVERBURDEN STOCKPILE
BOX CUT
STRIP 1
STRIP 2
STRIP 3
STRIP 4
STRIP 5
P2
CLEAN WATER DISCHARGE STRUCTURE
SITE BOUNDARY
CONTAINMENT BERM
DIRTY WATER DRAINAGE CHANNEL
HAUL ROAD
ROM STOCKPILE
MOBILE CRUSHING AND SCREENING
SILT TRAP
EMERGENCY SPILLWAY
P4
POLLUTION CONTROL DAM
COAL STOCKPILE
TOPSOIL STOCKPILE
MOBILE FUEL AND STORAGE
MINE FLEET HARD PARK AND WORKSHOP
WASTE MANAGEMENT
DMS WASHPLANT
P3
CLEAN WATER DISCHARGE STRUCTURE
WEIGHBRIDGE
SITE ACCESS
STAFF AND VISITOR PARKING
MOBILE OFFICES
Y: -36100
X: 2894000

3.d.i Listed and specified activities

Section 16 of the Mineral and Petroleum Resources Development Act, 200 2 (Act No. 28 of 2002) requires, upon request by the Minister that an Environmental Management Plan be submitted and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that activities, which may impact on the environment must obtain an environmental authorisation from a relevant authority before commencing with the activities. Such activities are listed under Regulations Listing Notice 1. Please refer to the following table for the details in terms of the listed activities.

Table 3.3: Listed and specific activities

APPLICABLE LISTING NOTICE (GNR 983, GNR 984 or GNR 985; as amended)		NAME OF ACTIVITY	Aerial extent of the Activity Ha or m2	WASTE MANAGEMENT AUTHORISATION
Listing Notice 1 (GNR 983)				
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Stormwater management structures	tbc	No
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	Process / Waste / Return Water pipeline infrastructure	tbc	No
21	Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including — (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.	Application for a mining permit	~5ha	No

3.d.ii Description of Activities to be Undertaken

Site Preparation

Site preparation mainly deals with the stripping and stockpiling of topsoil prior to the mining activities commencing as this might affect the quality and quantity of available valuable topsoil resources. The main objectives of soil management are to:

- Minimal removing and stockpiling of topsoil due to historical mining activities;
- optimise the preservation and recovery of topsoil for rehabilitation;
- identify soil resources and stripping guidelines;
- identify surface areas requiring stripping (to minimise over clearing);
- manage topsoil reserves to not degrade the resource;
- identify stockpile locations and dimensions; and
- identify soil movements for rehabilitation use.

In accordance with the objective of providing sufficient stable soil material for rehabilitation and to optimise soil recovery, the following strategies have been adopted:

- stockpiles to be located outside proposed mine disturbance areas;
- construction of stockpiles by dozers rather than scrapers to minimise structural degradation;
- construction of stockpiles with a "rough" surface condition to reduce erosion hazard, improve drainage and promote revegetation; and
- revegetation of stockpiles with appropriate fertiliser and seed to minimise weed infestation, maintain soil organic matter levels, soil structure and microbial activity and maximise the vegetative cover of the stockpile depending on the exposure timeframes.

Disturbance areas will be stripped progressively (i.e. only as required) to reduce erosion and sediment generation, to reduce the extent of topsoil stockpiles and to utilise stripped topsoil as soon as possible for rehabilitation. Rehabilitation of disturbed areas (i.e. roads, embankments and stripped mining footprint) will be undertaken as practicable after these structures are completed or as areas are no longer required. Soil surveys over the open cut area, beneath proposed mine waste emplacements and other infrastructure areas will determine the depth of topsoil. It should be noted that it is important that for topsoil recovered from the areas it is required that underlying material is not inadvertently collected since it is unsuitable for reuse in rehabilitation.

A general protocol for soil handling is presented below and includes soil handling measures which optimise the retention of soil characteristics (in terms of nutrients and micro-organisms) favourable to plant growth:

- The surface of the completed stockpiles will be left in a "rough" condition to help promote water infiltration and minimise erosion prior to vegetation establishment;
- Topsoil stockpiles to have a maximum height of 3 m to limit the potential for anaerobic conditions to develop within the soil pile;
- Topsoil stockpiles to have an embankment grade of approximately 1V:4H (to limit the potential for erosion of the outer pile face);
- Topsoil stockpiles will be seeded and fertilised; and
- Soil rejuvenation practices will be undertaken if required prior to re-spreading as part of rehabilitation works.

Box Cut Opencast Mining with a Roll-over Rehabilitation Sequence

Opencast mining using the truck and shovel lateral sequential rollover mining method will be undertaken. Mining will commence from the initial box cut. A haul road that will be extended from the nearby existing road will be used as access to the mining area.

The soft overburden will be removed by mechanical methods. The hard overburden will be drilled and blasted and then removed by mechanical methods. The coal will be drilled and blasted prior to removal.

Replacement of overburden materials into the mining pit will be according to the following sequence:

1. Placement of hard overburden at base of pit;
2. Placement of soft overburden;
3. Final cover of topsoil (minimum 500 mm)

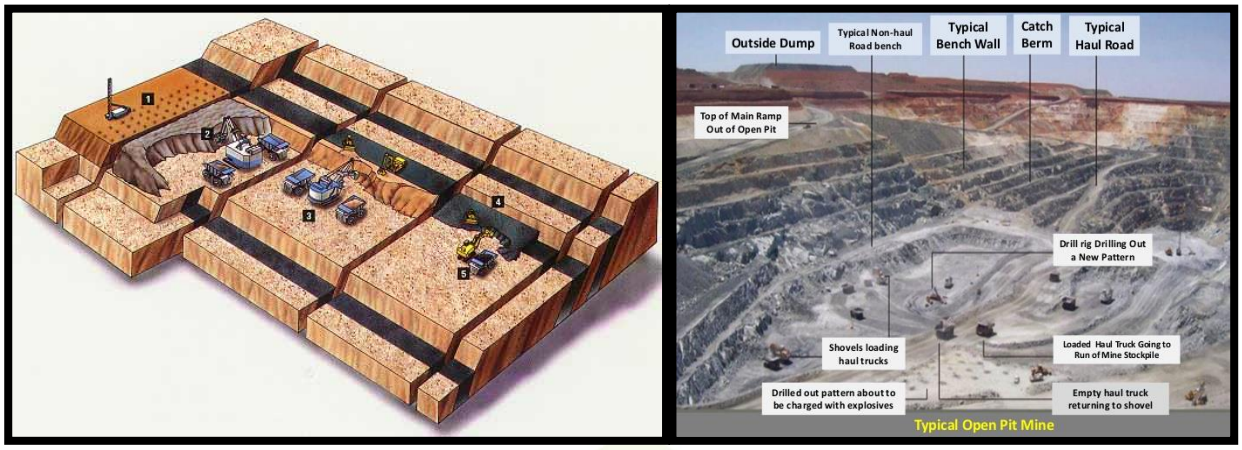


Figure 3.4: Typical Opencast Concurrent Roll Over Rehabilitation Mining Technique

ROM Coal

- The Run of Mine (RoM) will be loaded and hauled to the designated off-site beneficiation plant.

Access and Haul Roads Construction

The mine access road will lead off one of the dirt roads serving the purpose to only give farmers access to their properties. The dirt road will be upgraded to the applicable standards which includes a gravel road leading into the mine. The road will be used to access the mine offices, workshop complex, and mining area. Coal transportation trucks will also use this road to enter and exit the mine premises, including travelling to the weighbridge.

Semi Temporary Site and Security Offices

The site offices for the project, including a small security hut at the entrance of the mining area next to the main entrance road will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal footprint. Keeping the disturbance area minimal and ensuring ease of mine closure and rehabilitation after life of mine make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices.

Figure 3.5: Typical semi temporary site offices and security office

Semi Temporary Sanitation and Change House

Similar to the structure indicated in the section above, will the semi temporary sanitation and change house also be container type facilities which can easily be brought to site and also removed after life of mine. For the change house and ablution facility a septic tank system will be implemented which is temporary of nature and can also be decommissioned easily. The septic tank system will ensure

a 'honey-sucker' type sewage removal vehicle can remove and dispose of sewage at an appropriate facility off site. This ensures no major construction and approval is required for a full scale sewage treatment facility. Mobile chemical toilets will also be used where necessary and supplied by an approved contractor whom will be responsible for the management of these toilets. Water requirements relating to ablutions and drinking water are expected to be minimal and if water cannot be sourced on site from a borehole it will be brought in by a tanker. The current expectation is that 50 employees will require 45 litre per person per day (litre pp/day) amounting to 2 460 litres per day.

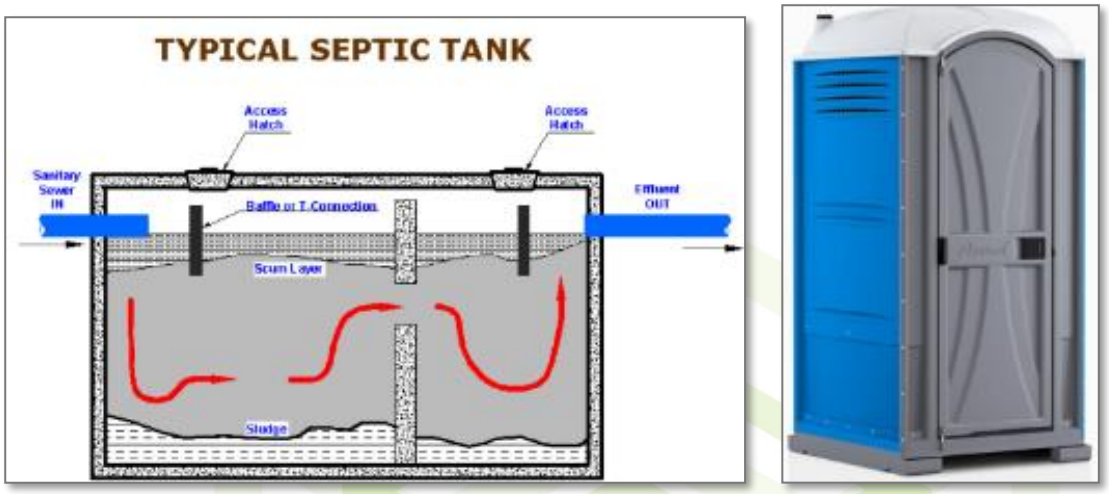


Figure 3.6: Typical septic tank cross section and chemical toilet illustration

Mobile Fuel Storage

The main fuel storage will be diesel in a mobile fuel storage tank with a drip tray designed to hold 110% the capacity of the tanks. The fuel bowser will be stored off site.

Figure 3.7: Typical mobile fuel storage trailer with bunded tray

Pollution Control Facility/Dam (Evaporation and Dust Suppression Usages)

Pollution control dams (PCDs) form an integral and important part of the water management systems on a mine. Different types of PCDs may exist on a mine site, such as process water dams, storm water dams, evaporation dams and other dams, possibly including excess mine water dams and natural pans.

The purpose of PCDs for the mine and in the water management circuits are to:

- Minimise the impact of polluted water on the water resource;
- Minimise the area that is polluted as far as possible, by separating out clean and dirty catchments; and

- Capture and retain the dirty water contribution to the PCDs that cannot be discharged to the water resource, due to water quality constraints, and manage this dirty water through recycling, reuse, evaporation and/or treatment and authorised discharge.

The image below is an illustration of the typical pollution control dam that will be constructed.

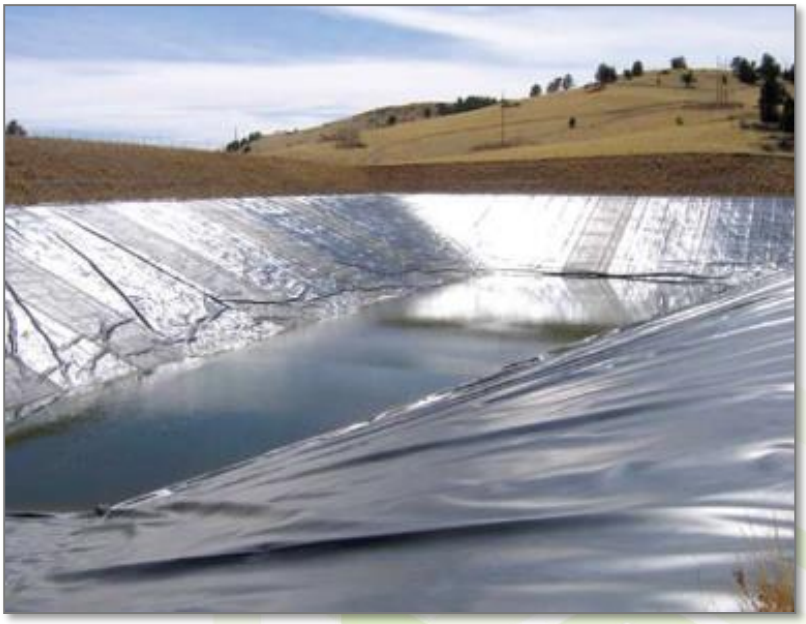


Figure 3.8: Lined pollution control dam (PCD) illustration

Clean and Dirty Water Separation

A detailed surface water management plan will be drawn up as part of the Water Use License Application including the determination of flood lines, identification of sensitive receptors and existing surface water systems and flow paths, and civil engineering design reports for the required trenches and water management facilities. The Geohydrological investigation will also feed into these designs as the anticipated pollution will be modelled. Trenching around the mining area forms part of the clean and dirty water separation and is to a large extent based on the water balance as calculated by the civil engineering team. The image below is a typical illustration of aspects to consider during the calculation of the opencast mining area water balance.

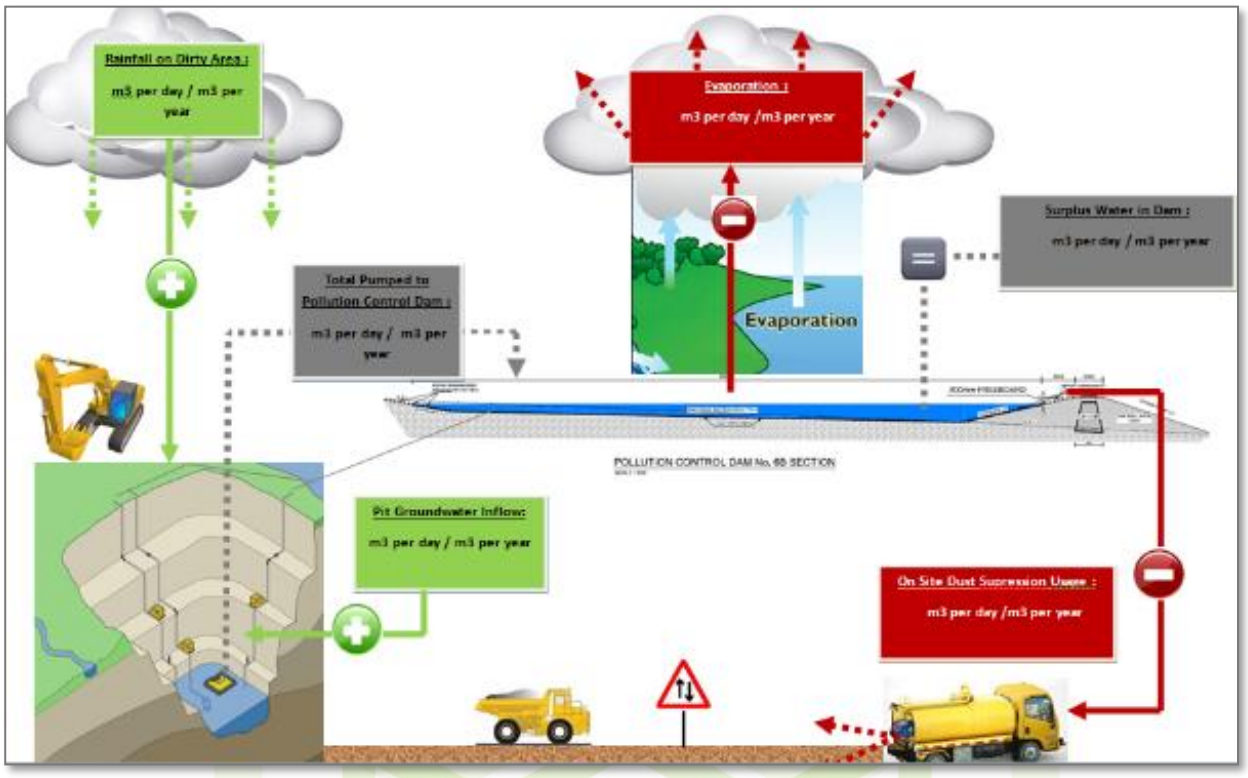


Figure 3.9: Typical water balance considerations during the design of a clean and dirty water separation system

Further images for clarification purposes have been provided below to indicating cross sections of both the dirty water and clean water diversion trenches which will be constructed around the mining area. These designs will also form part of the final master plan to be implemented during the Water Use License Application.

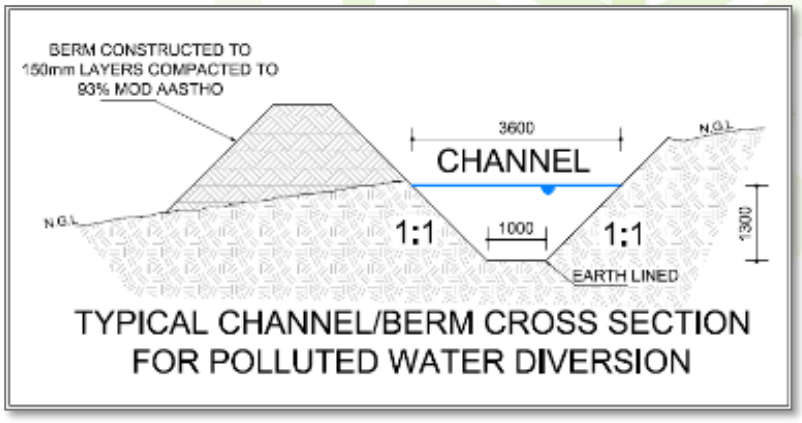


Figure 3.10: Typical Channel / Berm Cross Section For Polluted Water Diversion

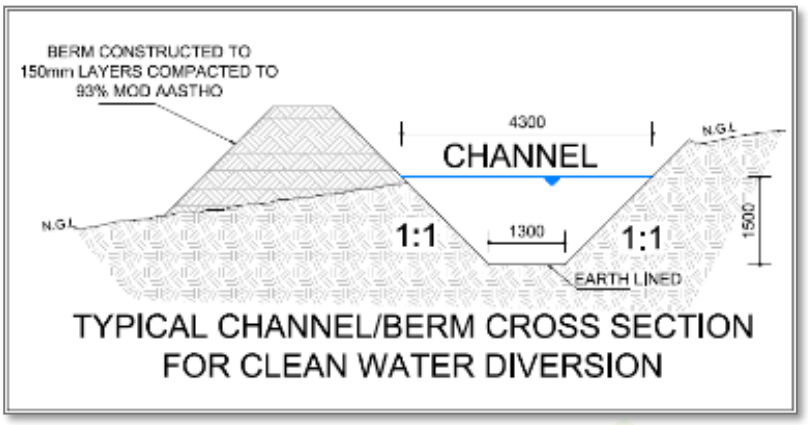


Figure 3.11: Typical channel/berm cross section for clean water diversion

Fencing

Fencing of the entire mining area will be required as a means of ensuring safety and also keeping trespassers at bay. Fences will be clearly demarcated and appropriate signage will be displayed, similar to the signs in the images below. Fencing of the sensitive receptors such as wetlands will also take place ensuring no mining personnel will enter these areas and that it will remain protected for the duration of the project. Sites of archaeological and heritage importance will also need to be fenced off while safe access to these sites will be provided. The necessary signage will also be erected at sites of archaeological and/or heritage importance to ensure visitors can easily and safely access the premises.

Figure 3.12: Typical mine fence signage

Staff and Visitors Parking

Designated parking areas will be constructed by compaction of the subsoil after removal, storage and preservation of the valuable layer of topsoil. Storm water management control around these areas will be implemented while the necessary signage will be erected to ensure optimal safety while reverse parking will be implemented at all parking bays. The necessary waste receptacles as well as oil spill kits will be provided at these sites in case of accidental spillage or leakage of hydrocarbon fuel/oil/greases from the vehicles.

Drilling and Blasting

Blasting of mine overburden to allow efficient recovery of the underlying coal can have impacts on the surrounding community. These impacts mainly include vibration through the air (overpressure) and earth (ground vibration) along with the generation of dust and fume. Overpressure and ground vibration limits in place for private residences and heritage structures are prescribed by government based on standards. Blasts are designed and managed to minimise the risk of exceeding these limits, and to minimise impacts they have on the community, surrounding structures and environment.

Due to the nature of the activities associated with open cast activities, blasting will mainly occur during the construction phase of the initial box cut, however, subsequent blasting to remove overburden and gain access to the mineral reserve will also take place during the life of mine. A suitably qualified blasting contractor will be appointed to construct a blasting design and conduct blasting activities.

There will be no explosives magazine on site and the blasting contractor will be required to supply the explosives and consumables required to blast.

Topsoil, Subsoil, Overburden Stockpiles

All topsoil, subsoil and overburden material will be removed during the mining operation and stockpiled separately for the purpose of backfill rehabilitation. The topsoil stockpiles will not exceed a height of six meters which is high enough to reduce leaching impacts of stockpiled topsoil. The subsoil and overburden stockpiles will however exceed this height.

Waste Management

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill.

3.e POLICY AND LEGISLATIVE CONTEXT

Table 3.4: Policy and legislative table

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT? (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)	The project requires a Mining Permit authorisation from the Department of Mineral Resources	A mining permit application was accepted on 10/02/2020 by the DMR.
NEMA Environmental Impact Assessment (EIA) Regulations, as Amended 2017	This Basic Assessment and Environmental Management Plan to be conducted. Specialist environmental information of the project area will be assessed. Mitigation measures and recommendations where provided according to best practice standards.	An Application for Environmental Authorisation will be submitted to the Mpumalanga DMR with the mining permit application lodgement on SAMRAD.
The South African Constitution **The South African Constitution (Act 108 of 1996) constitutes the supreme law of the country and guarantee the rights of all people in South Africa**	Applied at potential impacts identification as well as mitigation measures and public participation	A public participation process is followed and consultations are accordingly undertaken. An EMPr and awareness plan will be designed according to the issues raised during this process.
National Environmental Management: Biodiversity Act , 2004	Presence of indigenous trees or threatened species, if permit is required. To be determined by ecologist prior to mining activities.	The entire site is disturbed by agricultural activities
National Environmental Management: Waste Act	Provisions of the waste act were consulted to determine whether a waste license was required for any aspect of the proposed development.	The mine does not plan to store general or hazardous waste on site
Section 38 of the National Heritage Resources Act (Act No. 25 of 1999)	Legislation consulted during the impact assessment process, to determine what legal requirements with regards to the management of national heritage resources were relevant to this application.	An upload of the BAR will be done on the SAHRIS online system for comment.
National Environmental Biodiversity Act The National Environmental Management Biodiversity Act (NEM:BA), 2004 (Act No.10 of 2004), provides for: (i) the management and conservation of South Africa`s biodiversity within the framework of the National Environmental Management Act, 1998; (ii) the protection of species and ecosystems that warrant national protection;	Baseline review of the biodiversity - access to site was denied by the landowners at this stage of the process.	SANBI database will be used to determine conservancy status as well as mitigation measures for alien invasive species encroaching the project area.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT? (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
(iii) the sustainable use of indigenous biological resources; (iv) the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; (v) the establishment and functions of a South African National Biodiversity Institute;		
National Water Act The NWA (Act No. 36 of 1998)	The proposed activities do require a water use license.	The department has been notified of the proposed project and comments will be addressed. An IWULA will be applied for as part of the project
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004);	Dust monitoring on site during the operation	As part of the EMPr dust suppression methods will be used.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996);	Health and Safety Policy.	Risk Impact Assessment to be conducted.
Section 38 of the National Heritage Resources Act (Act No. 46 of 1999)	Legislation consulted during the impact assessment process, to determine what legal requirements with regards to the management of national heritage resources were relevant to this application.	An upload of the BAR will be done on the SAHRIS online system for comment
National Development Plan (2012) **The National Development Plan outlines what we should do to eradicate poverty, increase employment and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety.**	Used to identify project Need and Desirability and alignment with National Policy.	To form part of the project background and socio-economic evaluation.
Municipal Systems Act, 2000 (Act No. 32 of 2000) **Section 100 of the Mineral and Petroleum Resources Development Act (MPRDA) tasks the Minister to establish, assess and where necessary, revise the framework and targets for the entry and ongoing participation of historically disadvantaged South Africans into the sector**	The project must be tested against the local and district IDP and SDF.	Used to assess the need and desirability.
Mining Charter	The project must align itself with the principles of the Charter	Included in the SLP

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT? (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Section 100 of the Mineral and Petroleum Resources Development Act (MPRDA) tasks the Minister to establish, assess and where necessary, revise the framework and targets for the entry and ongoing participation of historically disadvantaged South Africans into the sector		
Mpumalanga SDF	Used in the BAR to identify Need and Desirability	Guideline considered during the assessment of the need and desirability of the proposed development, at the provincial scale.
Nkangala District Municipality	Source of background demographic and socio-economic information.	Utilized as a source of demographic and socio-economic information for the Nkangala District.
Emalahleni Local Municipality Solid Waste Management by-law, No.2632, 13 January 2016	Waste Management Measures on site should mine come into operation	Used to provide for procedures, methods, practices and standards to regulate the disposal of solid waste and the removal thereof within the area under the jurisdiction of the Municipality
Emalahleni Local Municipality Noise Control by-laws, No.2632. 13 January 2016	Management Measures on site should mine come into operation	Target noise levels that should not be exceeded and monitoring recommendations
Emalahleni Local Municipality Air Quality Management By-laws, No.2760. 21 September 2016	Management Measures on site should mine come into operation	To ensure that air pollution is avoided, or where it cannot be altogether avoided, mitigated or minimized.

3.f NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.

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

- South African economy heavily relies on the mining sector. Successful mining for coal will boost the current struggling national economy as the project will advance to mining right phase. The mining sector has provided more employment opportunities for the citizens in general. The Project is in line with the relevant IDP, SDF, EMF and PDP. There is no reason why this development should not be considered at this particular point in time considering the high probability of a reserve as proved by other resources in the vicinity of the area.
- The mining industry is identified as one of the key components toward Rapid Economic Growth in order to reduce poverty and minimise unemployment Growth (State of the Nation Address,2019). The key issues include:
    - The need for a strong capable state
    - Cost reduction for businesses and consumers
    - The need for reindustrialisation and a revitalised mining sector
    - Faster growth in tourism
    - Improved infrastructure
    - Better support for small businesses
    - Marked reduction in unemployment.
- The project is in line with the 2012 National Development Plans' Nine Point Plan which is aimed at reigniting the economy to be able to create much-needed jobs include industrialisation, mining and beneficiation, agriculture and agro-processing, energy, small, medium and micro enterprises (SMMEs), managing workplace conflict, attracting investments, growing the oceans economy and tourism. Cross-cutting areas such as science and technology, water and sanitation infrastructure, transport infrastructure and broadband roll-out have also been added.
- Although small scale mining (<5ha) is not seen as an activity that significantly and sustainably contributes to an area's economy, it is a precursor to possible mining right activities.
- The activity of mining has numerous social and economic benefits in local, regional and national context. These include: 1. SMME development 2. Development to future opportunities 3. Skills development 4. Job creation 5. Local economic development 6. Contribution to local and national tax income (royalties, companies' tax etc.) 7. Contribution to the national gross domestic product.
- The need to conduct small scale mining is therefore a crucial step in being able to ascertain if it is feasible to investigate future mining and in turn the benefits indicated in points above.

3.g MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE.

The area is located in the Witbank Coal Field, on areas previously mined through underground mining. The site is preferred due to the low ecological sensitivity, and the area already being owned by a mining company.

In terms of the technologies and activities proposed, roll-over mining is seen as the most efficient way to undertake concurrent rehabilitation as mining progresses, therefore also reducing the cost required for rehabilitation after cessation of mining activities.

Location of infrastructure on site will be based on the most effective way to handle clean and dirty water separation.

3.h FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE.

GIS and spatial analysis will be used to determine the location of the mining infrastructure by considering environmental sensitivities. Furthermore, was the resource location determined through drilling exercises in order to locate the areas that will be most economical to mine, and the extent of the resource that will be mined.

3.h.i Details of the development footprint alternatives considered.

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

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

The remaining extent of portion 45 of the farm Vlaklaagte 45 IS is located in the Witbank Coal Field, on areas previously mined through underground mining. The site is preferred due to the low ecological sensitivity, and the area already being owned by a mining company.

b) the type of activity to be undertaken;

Opencast roll-over mining is seen as the most efficient way to undertake concurrent rehabilitation as mining progresses, therefore also reducing the cost required for rehabilitation after cessation of mining activities. Underground mining was not considered due to the small nature of the mining area and the deeper coal seems already being mined out.

c) the design or layout of the activity;

Location of infrastructure on site will be based on the most effective and cost sensitive way to handle clean and dirty water separation as well as the location of the coal resource.

d) The technology to be used in the activity

The technology proposed will be the most economically viable technology for the proposed operation.

e) the operational aspects of the activity; and

No feasible alternative technologies are available to conduct the rollover mining. Alternative technologies to the management of water, dust, and noise will be considered as mitigation measures in this report.

f) the option of not implementing the activity.

The option of not approving the activities will result in a significant loss to valuable information regarding the coal reserve status on this property.

In addition to this, should economical reserves be present and the applicant does not have the opportunity to mine, the opportunity job creation and resource utilisation will be lost.

3.h.ii Details of the Public Participation Process Followed

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

Section 41 of NEMA Regulation 982 set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process has and been followed at all times and is based on reciprocal dissemination of information. The following will be undertaken during the PPP:

8. Identification of Interested and Affected Parties (IAPs);
9. Notification of IAPs regarding the proposed project;
10. A public information meeting via ZOOM with IAPs, should there be interest;
11. Gathering comments, issues and concerns from IAPs;
12. Responding to IAP comments, issues and concerns;
13. Compilation and submission of results of consultation report to the DMR; and
14. Providing IAPs with the opportunity to review and comment on the basic assessment report.

It should be noted that the first Draft of this report was submitted to the Public for a 30 day review period during the height of the 2020 Covid-19 Pandemic, and very little response was received with regards to this application from I&APs. Due to financial constraints

from the client, relating to the Covid-19 pandemic, the initial advert was never placed during the first round of commenting.

The DMRE further sent comments and some changes were made to the report in response to the comments. The EAP therefore feels that it is fair to afford the I&APs another 30 day period to comment on the updated report, and also more people might have a chance to comment due to not be overwhelmed with the Covid-19 stresses and concerns.

Landowner and property detail

The registered owners of the farms were listed as follows:

Table 3.5: Directly affected landowners

	Landowner	Farm Portion	Landowner agreements
1.	DORSTFONTEIN COAL MINES PTY LTD	In respect of the remaining extent of the farm Vlaklaagte 45 IS	Land Access was arranged by Trentra (Pty) Ltd with Mr Malusi Buthelesi from Exxaro Coal Central (owners of Dorstfontein Coal Mines). Lease agreements will be negotiated if and when Authorisations are obtained. Access Agreements are in place.

Surrounding landowners who were contacted are listed below:

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Farm List

Date Requested	2020/04/24 10:43
Deeds Office	MPUMALANGA
Registration Division	IS
Farm Name	-
Farm Number	45
Remaining Extent	NOT SELECTED

PORTION LIST

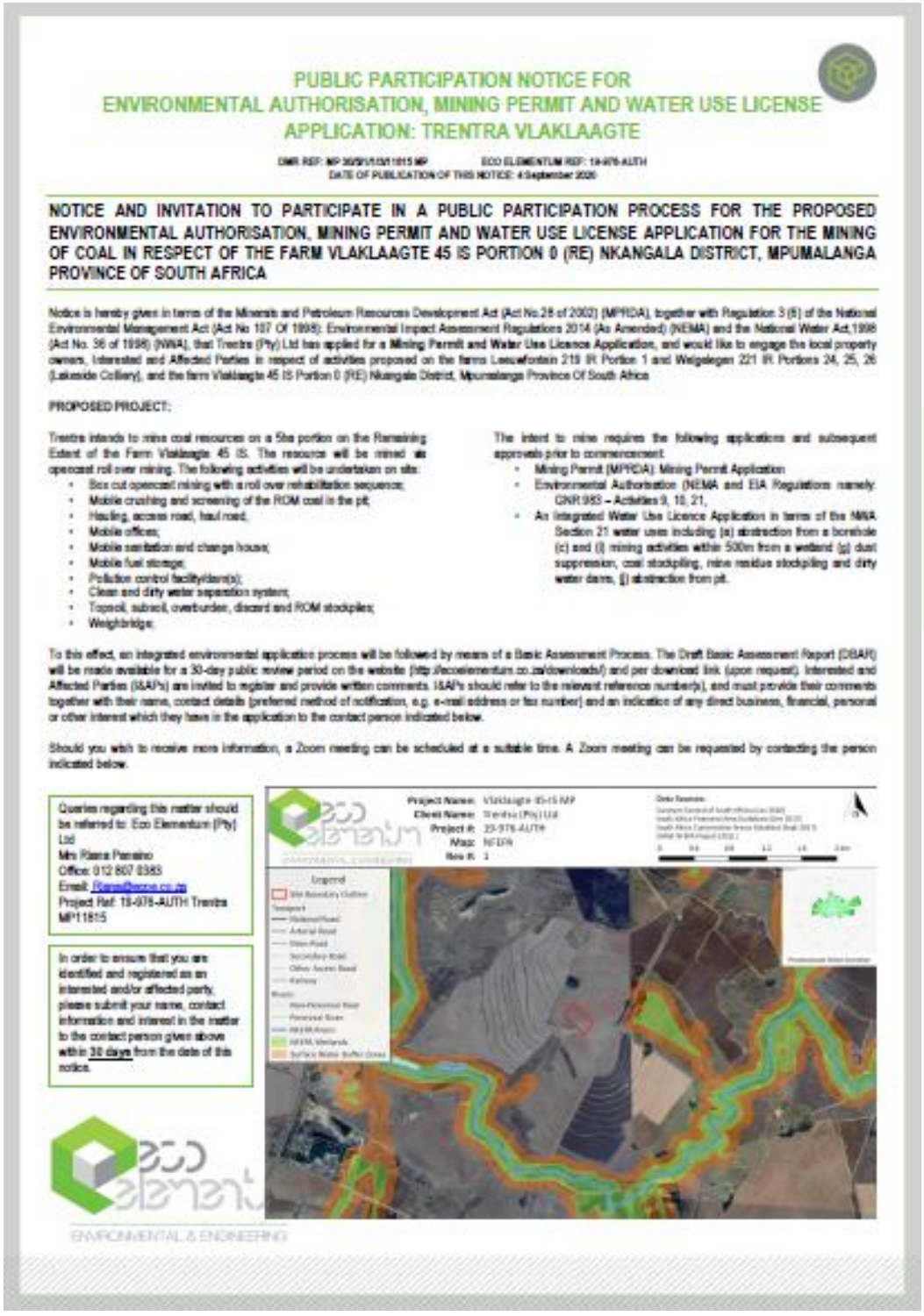
Portion	Owner	Title Deed	Registration Date	Purchase Price (R)
0	DORSTFONTEIN COAL MINES PTY LTD	T3714/2010	2010/03/09	8 042 150
6	SOUTH32 S A COAL HOLDINGS PTY LTD	T65609/1991	1991/09/30	0
13	DORSTFONTEIN COAL MINES PTY LTD	T3714/2010	2010/03/09	8 042 150
29	SOUTH32 S A COAL HOLDINGS PTY LTD	T65609/1991	1991/09/30	0
31	SOUTH32 S A COAL HOLDINGS PTY LTD	T65609/1991	1991/09/30	0
34	ISLARDU BOERDERY CC	T131595/2002	2002/10/24	2 201 028
36	SOUTH32 S A COAL HOLDINGS PTY LTD	T29662/1991	1991/05/15	0
39	DORSTFONTEIN COAL MINES PTY LTD	T3712/2010	2010/03/09	16 279 500
48	ISLARDU BOERDERY CC	T131595/2002	2002/10/24	2 201 028
50	SOUTH32 S A COAL HOLDINGS PTY LTD	T32191/1993	1993/04/29	0

Table 3.6: Interested and Affected Party Database

Interest	SG code	Farm			Ptn	Owner	Contact	Cell	email
Landowner	T0IS00000000004500000	VLAKLAAGTE	45	IS	0	DORSTFONTEIN COAL MINES PTY LTD	Malusi Buthelezi		malusi.buthelezi@exxaro.com
Adjacent Landowner	T0IS00000000004500006	VLAKLAAGTE	45	IS	6	SOUTH32 S A COAL HOLDINGS PTY LTD			
	T0IS00000000004500013	VLAKLAAGTE	45	IS	13	DORSTFONTEIN COAL MINES PTY LTD			
	T0IS00000000004500029	VLAKLAAGTE	45	IS	29	SOUTH32 S A COAL HOLDINGS PTY LTD			
	T0IS00000000004500031	VLAKLAAGTE	45	IS	31	SOUTH32 S A COAL HOLDINGS PTY LTD			
	T0IS00000000004500034	VLAKLAAGTE	45	IS	34	ISLARDU BOERDERY CC	ISLARDU BOERDERY CC	823872995	
							Johannes Elardus Erasmus	823883107	
							Christiaan Joseph Schoeman	823883100	
	T0IS00000000004500036	VLAKLAAGTE	45	IS	36	SOUTH32 S A COAL HOLDINGS PTY LTD			
	T0IS00000000004500039	VLAKLAAGTE	45	IS	39	DORSTFONTEIN COAL MINES PTY LTD			
	T0IS00000000004500048	VLAKLAAGTE	45	IS	48	ISLARDU BOERDERY CC			
	T0IS00000000004500050	VLAKLAAGTE	45	IS	50	SOUTH32 S A COAL HOLDINGS PTY LTD			
	T0IS00000000047200000	LOURENS	472	IS	0	DORSTFONTEIN COAL MINES PTY LTD			
	T0IS00000000048300000	CLYDESDALE	483	IS	0	SOUTH32 S A COAL HOLDINGS PTY LTD			
Other I&AP's							Nico Swart	847102125	
							SP Mtsweni	832657781	twenis@gmail.com
							J Mahlangu	835136302	
							MP Masina	715203913	
							SM Simku	843743907	
							JW Ntombela	715426224	

Site Notices

Site notices were placed around the proposed mining site in accordance with Regulation 41(2)(a), (3) and (4) of the Environmental Impact Assessment Regulations Published under Government Notice R982 in *Government Gazette* 38282 of 4 December 2014 (as amended)



PUBLIC PARTICIPATION NOTICE FOR
ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION: TRENTRA VLAKLAAGTE

DMR REF: MP 30/5/1/1/2/11815 MP ECO ELEMENTUM REF: 19-976-AUTH
DATE OF PUBLICATION OF THIS NOTICE: 4 September 2020

NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION FOR THE MINING OF COAL IN RESPECT OF THE FARM VLAKLAAGTE 45 IS PORTION 0 (RE) NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA

Notice is hereby given in terms of the Minerals and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA), together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended) (NEMA) and the National Water Act,1998 (Act No. 36 of 1998) (NWA), that Trentra (Pty) Ltd has applied for a Mining Permit and Water Use Licence Application, and would like to engage the local property owners, Interested and Affected Parties in respect of activities proposed on the farms Leeuwfontein 219 IR Portion 1 and Welgelegen 221 IR Portions 24, 25, 26 (Lakeside Colliery), and the farm Vlaklaagte 45 IS Portion 0 (RE) Nkangala District, Mpumalanga Province Of South Africa

PROPOSED PROJECT:

Trentra intends to mine coal resources on a 5ha portion on the Remaining Extent of the Farm Vlaklaagte 45 IS. The resource will be mined as opencast roll over mining. The following activities will be undertaken on site:

- Box cut opencast mining with a roll over rehabilitation sequence;
- Mobile crushing and screening of the ROM coal in the pit;
- Hauling, access road, haul road;
- Mobile offices;
- Mobile sanitation and change house;
- Mobile fuel storage;
- Pollution control facility/dam(s);
- Clean and dirty water separation system;
- Topsoil, subsoil, overburden, discard and ROM stockpiles;
- Weighbridge;

The intent to mine requires the following applications and subsequent approvals prior to commencement:

- Mining Permit (MPRDA): Mining Permit Application
- Environmental Authorisation (NEMA and EIA Regulations namely: GNR 983 – Activities 9, 10, 21,
- An Integrated Water Use Licence Application in terms of the NWA Section 21 water uses including (a) abstraction from a borehole (c) and (i) mining activities within 500m from a wetland (g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams, (j) abstraction from pit.

To this effect, an integrated environmental application process will be followed by means of a Basic Assessment Process. The Draft Basic Assessment Report (DBAR) will be made available for a 30-day public review period on the website (http://ecoelementum.co.za/downloads/) and per download link (upon request). Interested and Affected Parties (I&AP's) are invited to register and provide written comments. I&AP's should refer to the relevant reference number(s), and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below.

Should you wish to receive more information, a Zoom meeting can be scheduled at a suitable time. A Zoom meeting can be requested by contacting the person indicated below.

Queries regarding this matter should be referred to: Eco Elementum (Pty) Ltd
Mrs Riana Parsino
Office: 012 807 0383
Email: [redacted]
Project Ref: 19-976-AUTH Trentra MP11815

In order to ensure that you are identified and registered as an interested and/or affected party, please submit your name, contact information and interest in the matter to the contact person given above within 30 days from the date of this notice.


PUBLIC PARTICIPATION NOTICE FOR
ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION: TRENTRA VLAKLAAGTE
NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION FOR THE MINING OF COAL IN RESPECT OF THE FARM VLAKLAAGTE 45 IS PORTION 0 (RE) NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA
26.1550929249771 6S 29.3674339003469 35E
Emalahleni Local Municipality
Nkangala
Mpumalanga


PUBLIC PARTICIPATION NOTICE FOR
ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION: TRENTRA VLAKLAAGTE
NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION FOR THE MINING OF COAL IN RESPECT OF THE FARM VLAKLAAGTE 45 IS PORTION 0 (RE) NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA
26.14023794466244S 29.33629076532868E
R544
Nkangala
Mpumalanga


PUBLIC PARTICIPATION NOTICE FOR
ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION: TRENTRA VLAKLAAGTE
NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION FOR THE MINING OF COAL IN RESPECT OF THE FARM VLAKLAAGTE 45 IS PORTION 0 (RE) NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA
26.1684166943193 15S 29.3327482813092 36E
Unnamed Road
Nkangala
Mpumalanga

Background Information Document

A Background Information Document (BID) was compiled and sent to interested and affected Parties (I&Aps) in accordance with Regulation 41(2)(b) and (3) of the Environmental Impact Assessment Regulations Published under Government Notice R982 in *Government Gazette* 38282 of 4 December 2014 (as amended)

ENVIRONMENTAL & ENGINEERING

BASIC ASSESSMENT PROCESS FOR THE PROPOSED TRENTRA VLAKLAAGTE MINING PERMIT AND BASIC ASSESSMENT APPLICATION

BACKGROUND INFORMATION DOCUMENT (BID) AND INVITATION TO COMMENT

28 August 2020

DMR REF: MP 30/5/1/1/3/11815 MP ECO ELEMENTUM REF: 19-976-AUTH

ENVIRONMENTAL ASSESSMENT PRACTITIONER: ECO ELEMENTUM (PTY) LTD

The Eco Elementum group of companies provide an array of independent integrated environmental and engineering services to support our clients across a wide spectrum of industries to ultimately ensure cost effective total environmental and legal compliance. As one of the leading reputable firms in the industry we pride ourselves with a dedicated experienced professional specialist team of Environmental Assessment Practitioners, Scientists and Civil Engineers that focus on high quality interdisciplinary innovative consulting, design and construction solutions while placing our team and client relations at the heart of the business
Eco Elementum will act as the Independent Environmental Assessment Practitioner (EAP), as well as the Public Participation Practitioner for this integrated environmental authorisation process and PPP.

Eco Elementum (Pty) Ltd | Office number: 012 807 0383 | Website: www.ecolementum.co.za | Email: info@ecoelementum.co.za

ENVIRONMENTAL & ENGINEERING

PURPOSE OF THIS DOCUMENT

The purpose of this document is to provide all interested and affected parties (I&APs) with information about the proposed Trentra (Pty) Ltd Vlaklaagte Mining Permit and Basic Assessment Application Project. In addition, the document also aims to:

- Introduce and explain the Basic Assessment (BAR) and Mining Permit process, including the public participation process (PPP) that will be followed
- Invite all I&APs to comment on the proposed project by raising issues of concern and/or suggestions for enhanced benefits/alternatives on any aspect related to the proposed development.

HOW TO REGISTER

To register, comment and/or obtain more information on the project please contact the following person(s):

Mrs Riana Panelino
Office: 012 807 0383
Email: riana@ecoe.co.za
Project Ref: 19-976-AUTH Trentra MP 11815 and BA

In order to ensure that you are identified and registered as an interested and/or affected party, please submit your name, contact information and interest / comment in the matter to the contact person given above within 30 days from the date of this notice.

INTRODUCTION AND BACKGROUND

Notice is hereby given in terms of the Minerals and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA), together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended) (NEMA) and the National Water Act,1998 (Act No. 36 of 1998) (NWA), that Trentra (Pty) Ltd has applied for a Mining Permit (MP 30/5/1/1/3/11815 MP) and a Water Use Licence, and would like to engage the local property owners, interested and Affected Parties in respect of activities proposed on the farm Vlaklaagte 45 IS Remaining Extent, Emalahleni Local Municipality, Nkangala District, Mpumalanga Province of South Africa

ACTIVITIES & INFRASTRUCTURE

The following activities will be undertaken on site:

- Box cut opencast mining with a roll over rehabilitation sequence;
- Mobile crushing and screening of the ROM coal in the pit;
- Hauling, access road, haul road,
- Mobile offices;
- Mobile sanitation and change house;
- Mobile fuel storage;
- Pollution control facility/dam(s);
- Clean and dirty water separation system;
- Topsoil, subsoil, overburden, discard and ROM stockpiles;
- Weighbridge;
- Waste management;

SPECIALIST STUDIES

- Air Quality Assessment
- Heritage Impact Assessment
- Ecological Assessment
- Geo-hydrological
- Soils, land use and land capability
- Financial Closure and Rehabilitation Study
- Geotechnical assessment
- Waste Classification

Eco Elementum (Pty) Ltd | Office number: 012 807 0383 | Website: www.ecolementum.co.za | Email: info@ecoelementum.co.za

WHAT IS A BAR /EMP

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002) (MPRDA) prescribes the processes to be followed when compiling the Basic Assessment (BA) and the Environmental Management Programme (EMP), in respect of listed activities and mining operations respectively, that forms the legal basis of this authorisation. The process aims to ensure that all relevant factors are considered when evaluating the potential environmental impacts of a project, as well as developing appropriate environmental management measures to mitigate these impacts.

The purpose of the BA is to assess the current environment in which a proposed activity will take place and assess all potential impacts in terms of its extent, duration, intensity and significance relating to the specific activity. The EMP describes the goals and objectives for environmental management to minimise or eliminate the potential environmental impacts, the action plans to bring effect to those goals and objectives, the procedures to be implemented to ensure integration of environmental management into the daily operations, as well as a plan to raise awareness of employees and the surrounding community with regards to environmental management.

LEGAL REQUIREMENT

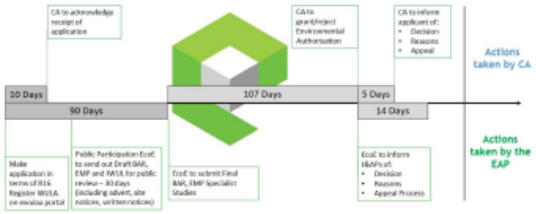
The mine requires the following approvals prior to commencement:

- Mining Permit (MPRDA);
- Environmental Authorisation (NEMA and EIA Regulations namely:
  - GNR 983 – Activities 21;
- An Integrated Water Use License renewal and amendment in terms of the NWA Section 21 water uses including
  - (a) abstraction from a borehole
  - (c) and (i) mining activities within 500m from a wetland
  - (g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams.

LOCATION

Closest town:	15km Northeast of Kriel
Farm Portions:	Vlaklaagte 45 IS, a portion of Remaining Extent
Local Municipality:	eMalahleni LM
District Municipality:	Nkangala DM

BA PROCESS



Eco Elementum (Pty) Ltd | Office number: 012 807 0383 | Website: www.ecolementum.co.za | Email: info@ecoelementum.co.za

HOW CAN I GET INVOLVED?

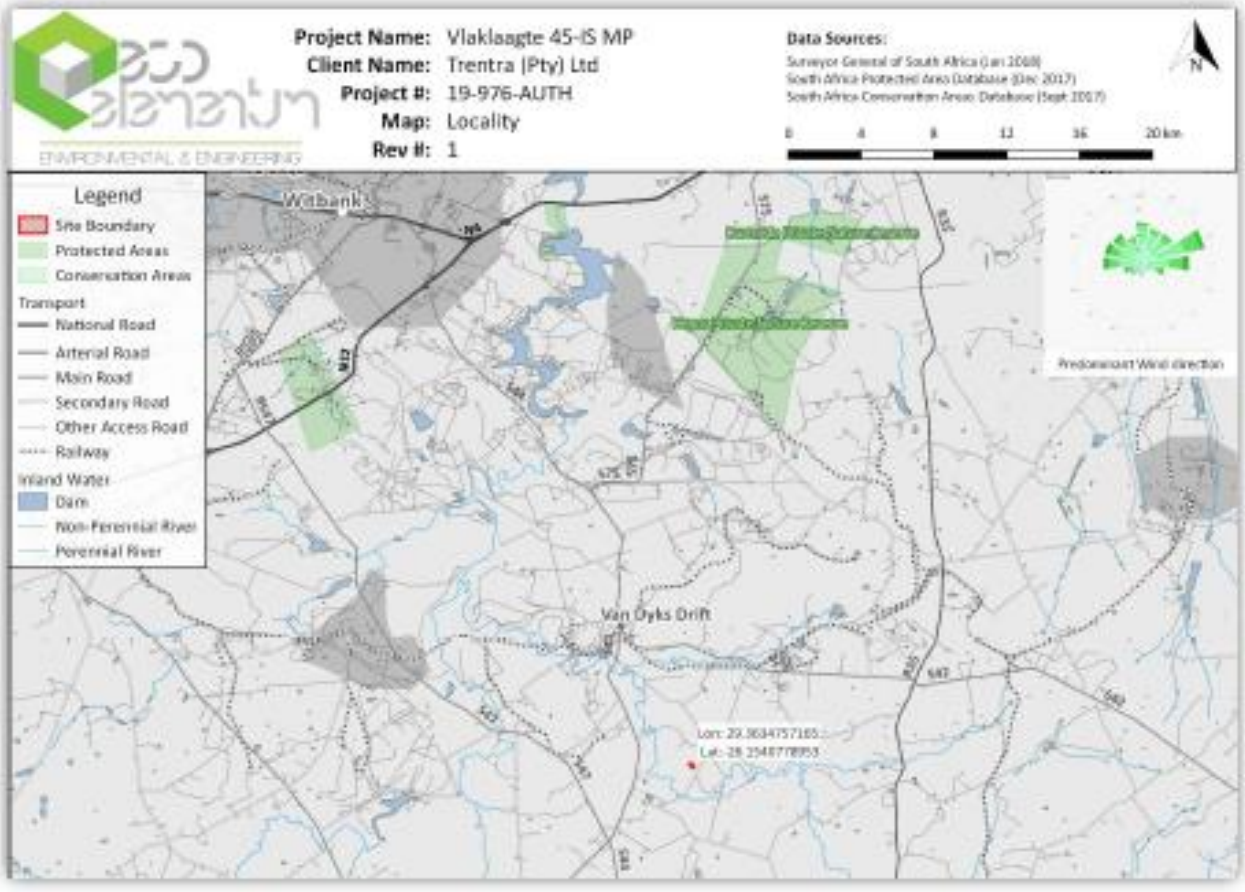
Please send us your comments/views so that we can address them during the BAR process. Once you register (see attached registration form), Eco Elementum (Pty) Ltd will keep you informed of the availability of the reports.

The Draft Scoping Report (DSR) will be made available for a 30-day public review period (28 August 2020 – 28 September 2020) on the website (http://ecoelementum.co.za/downloads/) and per download link (upon request).

To register and/or obtain more information on the project please contact the following person(s) or complete the attached registration form and return to:

Environmental Assessment Practitioner
Riana Ranaino
Office: 012 807 0383
Email: Riana@ecoe.co.za
Project Ref: 19-976-AUTH Trentra MP 11815 and BA

Eco Elementum (Pty) Ltd | Office number: 012 807 0383 | Website: www.ecolementum.co.za | Email: info@ecoelementum.co.za



Updated- 13/5/2021

ENVIRONMENTAL & ENGINEERING

19-976-AUTH Trentra MP 11815 and BA

DMR REFERENCE: MP 30/5/1/1/3/11815 MP

Registration & Comment Form

Title: ________ Name: ____

Surname: ____

Nature of Interest: ____

Postal or Residential address: ____

____

Tel: ______________________________

Mobile: ______________________________

Fax: ______________________________

Email address: ______________________________

Yes, I would like to participate in this public participation process	
No, I am not interested in participating	
I confirm that I received the BID	

Eco Elementum (Pty) Ltd | Office number: 012 807 0383 | Website: www.ecoelementum.co.za | Email: info@ecoelementum.co.za

ENVIRONMENTAL & ENGINEERING

COMMENTS (additional comment documents can be attached)

____

Signature: ______________________ Date: ______________

Eco Elementum (Pty) Ltd | Office number: 012 807 0383 | Website: www.ecoelementum.co.za | Email: info@ecoelementum.co.za

Advert placement

An Advert was placed in the Witbank News in accordance with Regulation 41(2)(c) and (3) of the Environmental Impact Assessment Regulations Published under Government Notice R982 in *Government Gazette* 38282 of 4 December 2014 (as amended).

Proof of placement for the second round of PPP will be submitted with the Resubmission of the report to the DMRE.

PUBLIC PARTICIPATION NOTICE FOR ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION: TRENTRA VLAKLAAGTE

NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION FOR THE MINING OF COAL IN RESPECT OF THE FARM VLAKLAAGTE 45 IS PORTION 0 (RE) NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA

Notice is hereby given in terms of the Minerals and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA), together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended) (NEMA) and the National Water Act,1998 (Act No. 36 of 1998) (NWA), that Trentra (Pty) Ltd has applied for a Mining Permit and Water Use Licence Application, and would like to engage the local property owners, Interested and Affected Parties in respect of activities proposed on the farm Vlaklaagte 45 IS Portion 0 (RE) Nkangala District, Mpumalanga Province Of South Africa

PROJECT TITLE: 19-976-AUTH Trentra (Pty) LTD: Vlaklaagte Mining Permit 11815MP

PROJECT PROPOSAL:
Trentra intends to mine coal resources on a 5ha portion on the Remaining Extent of the Farm Vlaklaagte 45 IS. The resource will be mined via opencast roll over mining. The Mining Permit activity triggers a Basic Assessment (BA) in terms of the NEMA regulations, which will be undertaken as part of the Environmental Authorisation Application Process. A Basic Assessment Report (BAR) will be available for review for another 30 days from 14 May 2021 to 14 June 2021; reports will be made available through Electronic copies sent (upon request) and on Eco Elementum's website: Ecoelementum.co.za/downloads.

OPPORTUNITY TO PARTICIPATE: Interested and affected parties (I&APs) are again invited to provide written comments. I&APs should refer to the relevant reference number(s), and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below within 30 days from the date of this notice

Queries regarding this matter should be referred to:
Eco Elementum (Pty) Ltd: Riana Panaino
Office: 012 807 0383 | **Email:** Riana@ecoe.co.za
DEPARTMENT MINERALS RESOURCES REFERENCE NUMBER: MP 30/5/1/1/3/11815 MP

Proof of notification

Email

An email notifying the I&APs of the proposed project, the public participation process, draft Scoping Report review and how to comment, was sent to all identified I&APs.

Riana Panaino

From:	Riana Panaino
Sent:	Friday, 28 August 2020 13:59
To:	'makusi.buthelezi@exxaro.com'; 'twenis@gmail.com'
Cc:	Kelebone Sekonyela; 'riana@ecoe.co.za'
Subject:	Trentra Vlaklaagte 11815MP Draft BAR for Public Review
Attachments:	Vlaklaagte 11815 BID Ver. 0.0.pdf

PUBLIC PARTICIPATION NOTICE FOR ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION: TRENTRA VLAKLAAGTE

DMR REF: MP 30/5/1/1/3/11815 MP **ECO ELEMENTUM REF: 19-976-AUTH**
DATE OF PUBLICATION OF THIS NOTICE: 28 August 2020

NOTICE AND INVITATION TO PARTICIPATE IN A PUBLIC PARTICIPATION PROCESS FOR THE PROPOSED ENVIRONMENTAL AUTHORISATION, MINING PERMIT AND WATER USE LICENSE APPLICATION FOR THE MINING OF COAL IN RESPECT OF THE FARM VLAKLAAGTE 45 IS PORTION 0 (RE) NKANGALA DISTRICT, MPUMALANGA PROVINCE OF SOUTH AFRICA

Notice is hereby given in terms of the Minerals and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA), together with Regulation 3 (6) of the National Environmental Management Act (Act No 107 Of 1998): Environmental Impact Assessment Regulations 2014 (As Amended) (NEMA) and the National Water Act,1998 (Act No. 36 of 1998) (NWA), that Trentra (Pty) Ltd has applied for a **Mining Permit and Water Use Licence Application**, and would like to engage the local property owners, Interested and Affected Parties in respect of activities proposed on the farms Leeuwfontein 219 IR Portion 1 and Welgelegen 221 IR Portions 24, 25, 26 (Lakeside Colliery), and the farm Vlaklaagte 45 IS Portion 0 (RE) Nkangala District, Mpumalanga Province Of South Africa

To this effect, an integrated environmental application process will be followed by means of a Basic Assessment Process. The Draft Basic Assessment Report (DBAR) will be made available for a 30-day public review period on the website (http://ecoelementum.co.za/downloads/) and per download link (upon request). Interested and Affected Parties (I&APs) are invited to register and provide written comments. I&APs should refer to the relevant reference number(s), and must provide their comments together with their name, contact details (preferred method of notification, e.g. e-mail address or fax number) and an indication of any direct business, financial, personal or other interest which they have in the application to the contact person indicated below.

Should you wish to receive more information, a Zoom meeting can be scheduled at a suitable time. A Zoom meeting can be requested by contacting the person indicated below.

RIANA PANAINO
Senior Environmental Consultant
BSc Hons Environmental Analysis and Management

1

SMS

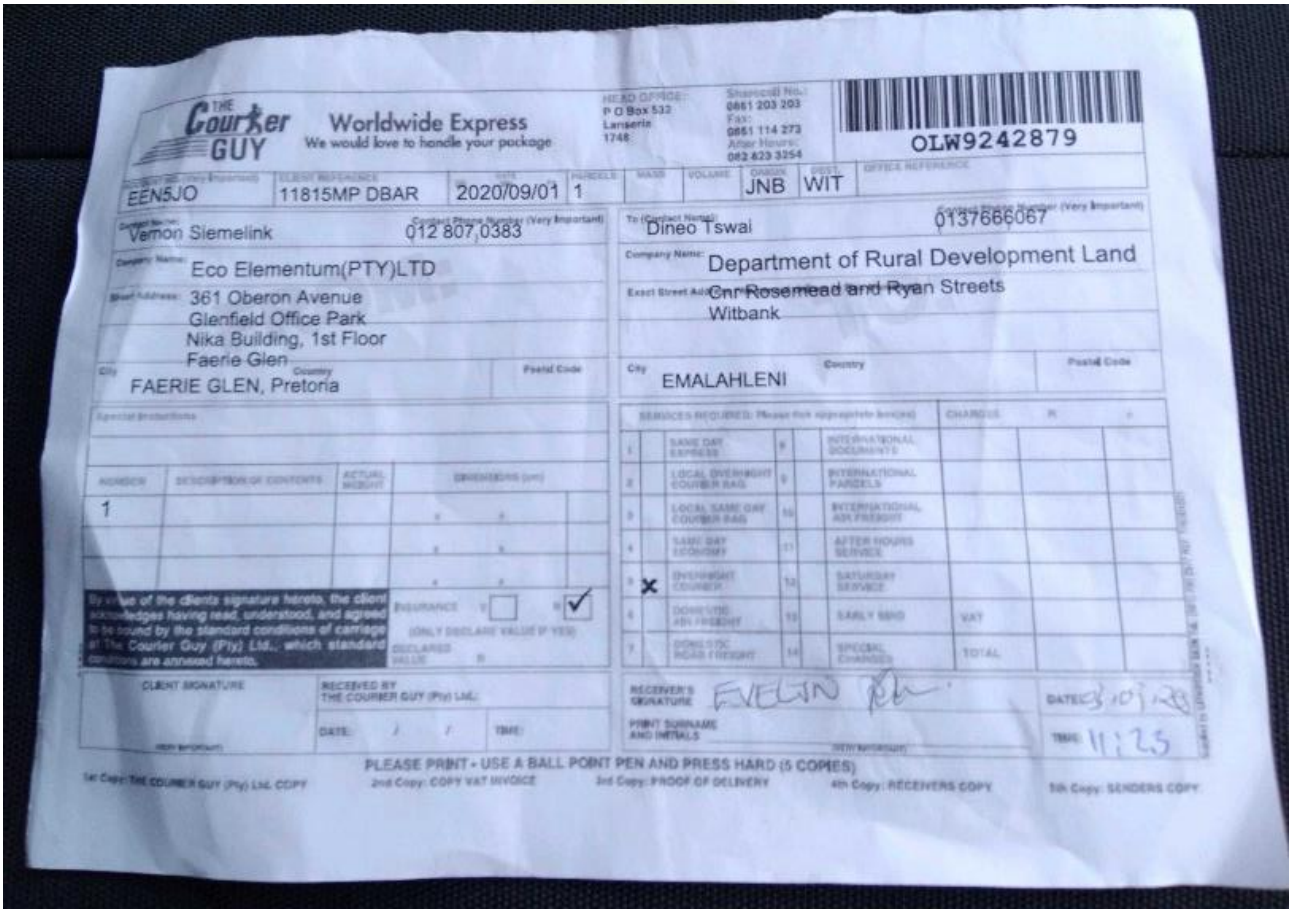
A sms notifying the I&APs of the proposed project, the public participation process, draft Scoping Report review and how to comment, was sent to all identified I&APs.

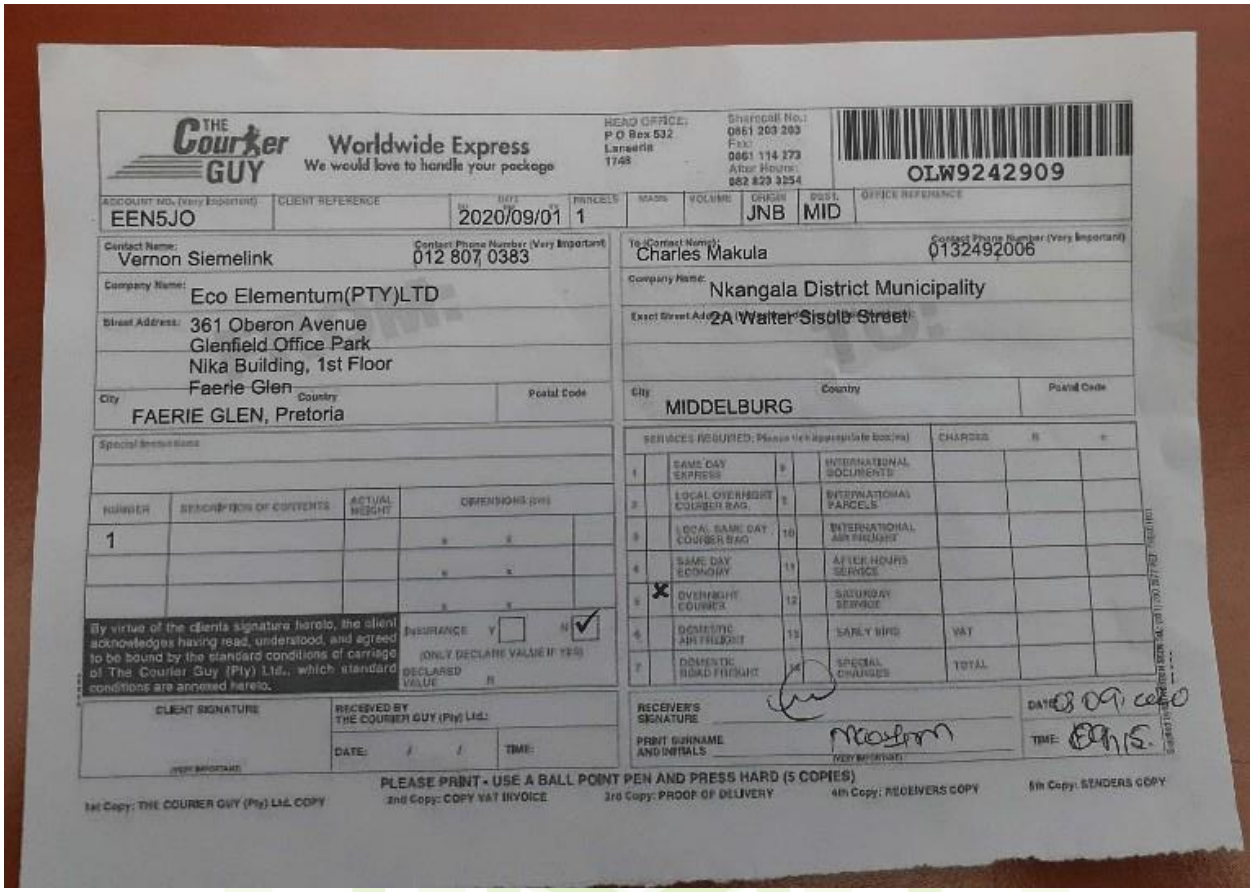
Contact	Phone number	Status	Status Date	Sent Data
MP Masina	27715203913	EXPIRED	8/28/2020 8:02:46 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
JW Ntombela	27715426224	DELIVRD	8/28/2020 2:12:51 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
ISLARDU BOERDERY CC	27823872995	DELIVRD	8/28/2020 2:12:50 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
Christiaan Joseph Schoeman	27823883100	DELIVRD	8/28/2020 2:12:51 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
Johannes Elardus Erasmus	27823883107	DELIVRD	8/28/2020 2:12:51 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
SP Mtsweni	27832657781	EXPIRED	8/28/2020 8:02:46 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
J Mahlangu	27835136302	UNDELIV	8/28/2020 4:12:51 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
SM Simku	27843743907	EXPIRED	8/28/2020 8:02:46 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.
Nico Swart	27847102125	DELIVRD	8/28/2020 2:12:53 PM	Notice is given in terms of the NEMA of the availability of the Trentra Vlaklaagte Basic Assessment Reports for Public Review. EcoElementum was appointed to assist with the environmental application process. The BAR will be available for 30 days on http://ecoelementum.co.za/downloads/. Contact: riana@ecoe.co.za/REPLY TO THIS SMS with comments.

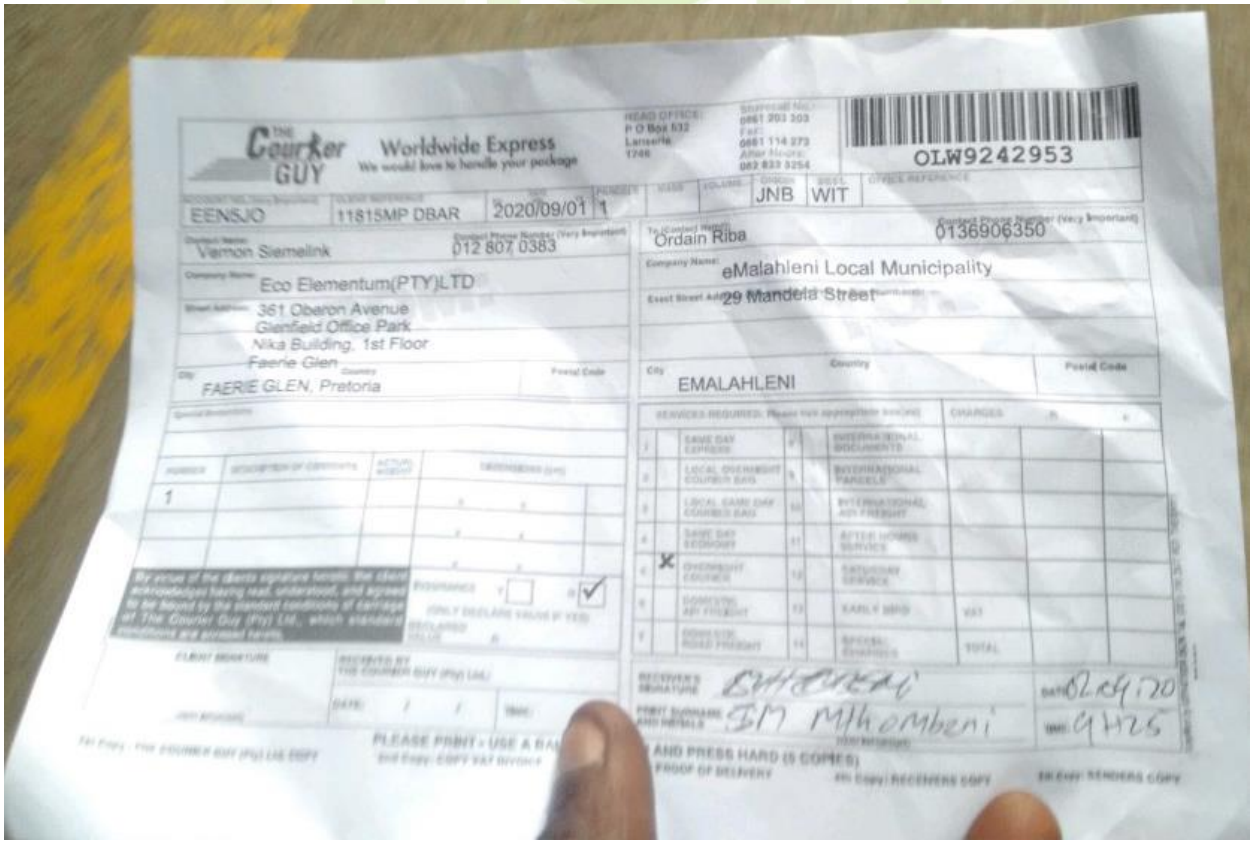
Submission of Draft Basic Assessment Report

The Draft Scoping Report was submitted to the following Commenting Authorities for comment:

Department	Attention to
Mpumalanga Provincial Government DARDLEA	Dineo Tswai
Nkangala District Municipality	Charles Makula
eMalahleni LM	Ordain Riba
Mpumulanga Tourism and Park Agency	Komilla Narasoo
Department of Roads and Transport	Mr Mxolisi Cyril Dlamini
Department of Agriculture Land Reform, and Rural Development	Love Shabane
Mpumalanga Economic Development & Tourism	Mr N Sebitso (Acting HOD) / Mr J Ndima (Director)
South African Heritage Resources Agency	Online submission




The Courier Guy
Worldwide Express
We would love to handle your package
OLW9242909
EEN5JO
2020/09/01
1
JNB
MID
Vernon Siemelink
012 807 0383
Eco Elementum(PTY)LTD
361 Oberon Avenue
Glenfield Office Park
Nika Building, 1st Floor
Faerie Glen
FAERIE GLEN, Pretoria
Charles Makula
0132492006
Nkangala District Municipality
2A Walter Sisulu Street
MIDDELBURG
PLEASE PRINT - USE A BALL POINT PEN AND PRESS HARD (5 COPIES)


The Courier Guy
Worldwide Express
We would love to handle your package
OLW9242953
EEN5JO
11815MP DBAR
2020/09/01
1
JNB
WIT
Vernon Siemelink
012 807 0383
Eco Elementum(PTY)LTD
361 Oberon Avenue
Glenfield Office Park
Nika Building, 1st Floor
Faerie Glen
FAERIE GLEN, Pretoria
Ordain Riba
0136906350
eMalahleni Local Municipality
29 Mandela Street
EMALAHLENI

THE Courier GUY

Worldwide Express
We would love to handle your package

HEAD OFFICE:
P O Box 532
Lanseria
1748

Sharecall No.:
0861 203 203
Fax:
0861 114 273
After Hours:
082 823 3254

OLW9242981

ACCOUNT NO. (Very Important)	CLIENT REFERENCE	DATE	PARCELS	MASS	VOLUME	ORIGIN	DEST.	OFFICE REFERENCE
EEN5JO	11815MP DBAR	2020/09/01	1			JNB	NLP	

Contact Name: Vernon Siemelink
Contact Phone Number (Very Important): 012 807 0383
Company Name: Eco Elementum(PTY)LTD
Street Address: 361 Oberon Avenue
Glenfield Office Park
Nika Building, 1st Floor
Faerie Glen
City: FAERIE GLEN, Pretoria
Country:
Postal Code:

To (Contact Name): Komilla Narasoo
Contact Phone Number (Very Important): 0137595300
Company Name: Mpumalanga Tourism and Parks Agency
Exact Street Address (and Suburb Box Numbers):
Hall's Gategay
N4 National Highway
City: MBOMBELA (NELSPRUIT)
Country:
Postal Code:

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3		LOCAL SAME DAY COURIER BAG	10	INTERNATIONAL AIR FREIGHT			
4		SAME DAY ECONOMY	11	AFTER HOURS SERVICE			
5	X	OVERNIGHT COURIER	12	SATURDAY SERVICE			
6		DOMESTIC AIR FREIGHT	13	EARLY BIRD	VAT		
7		DOMESTIC ROAD FREIGHT	14	SPECIAL CHARGES	TOTAL		

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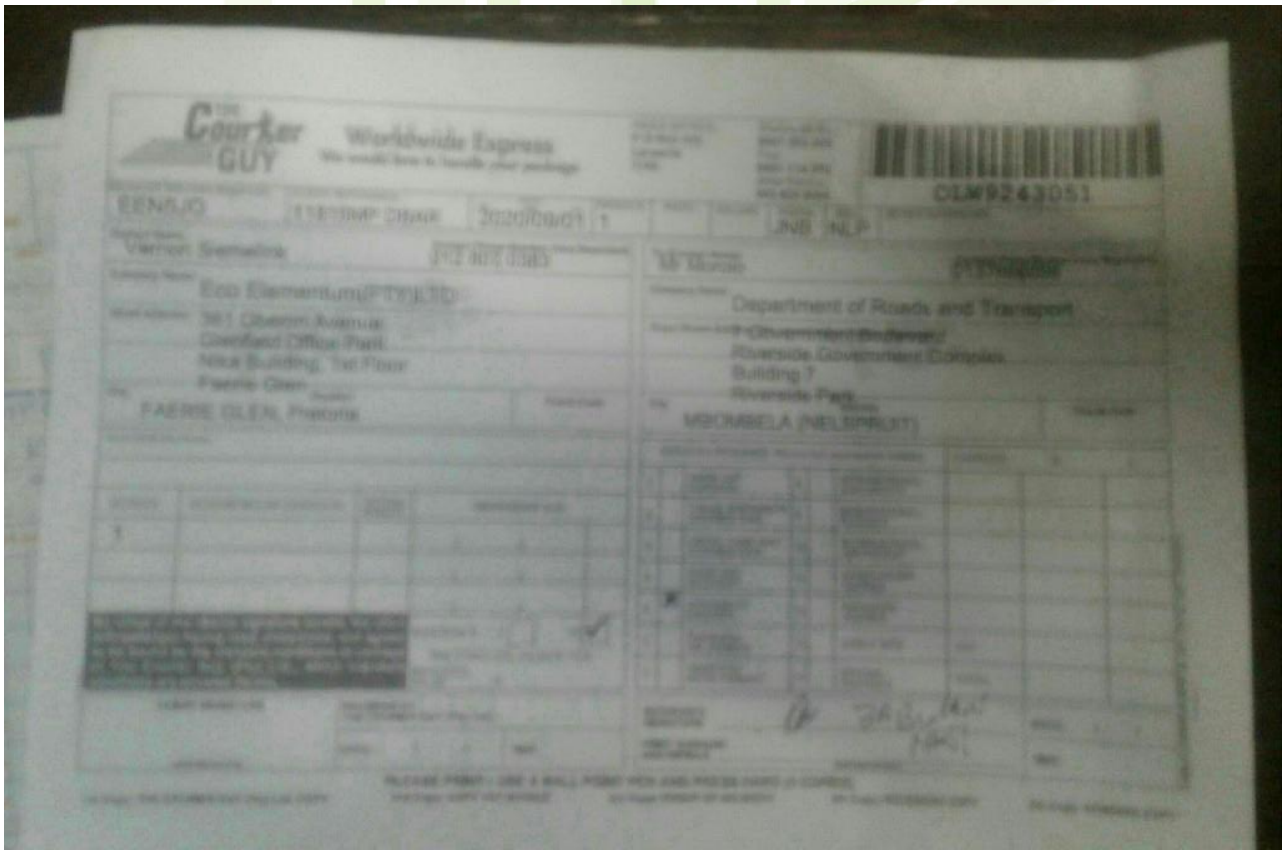

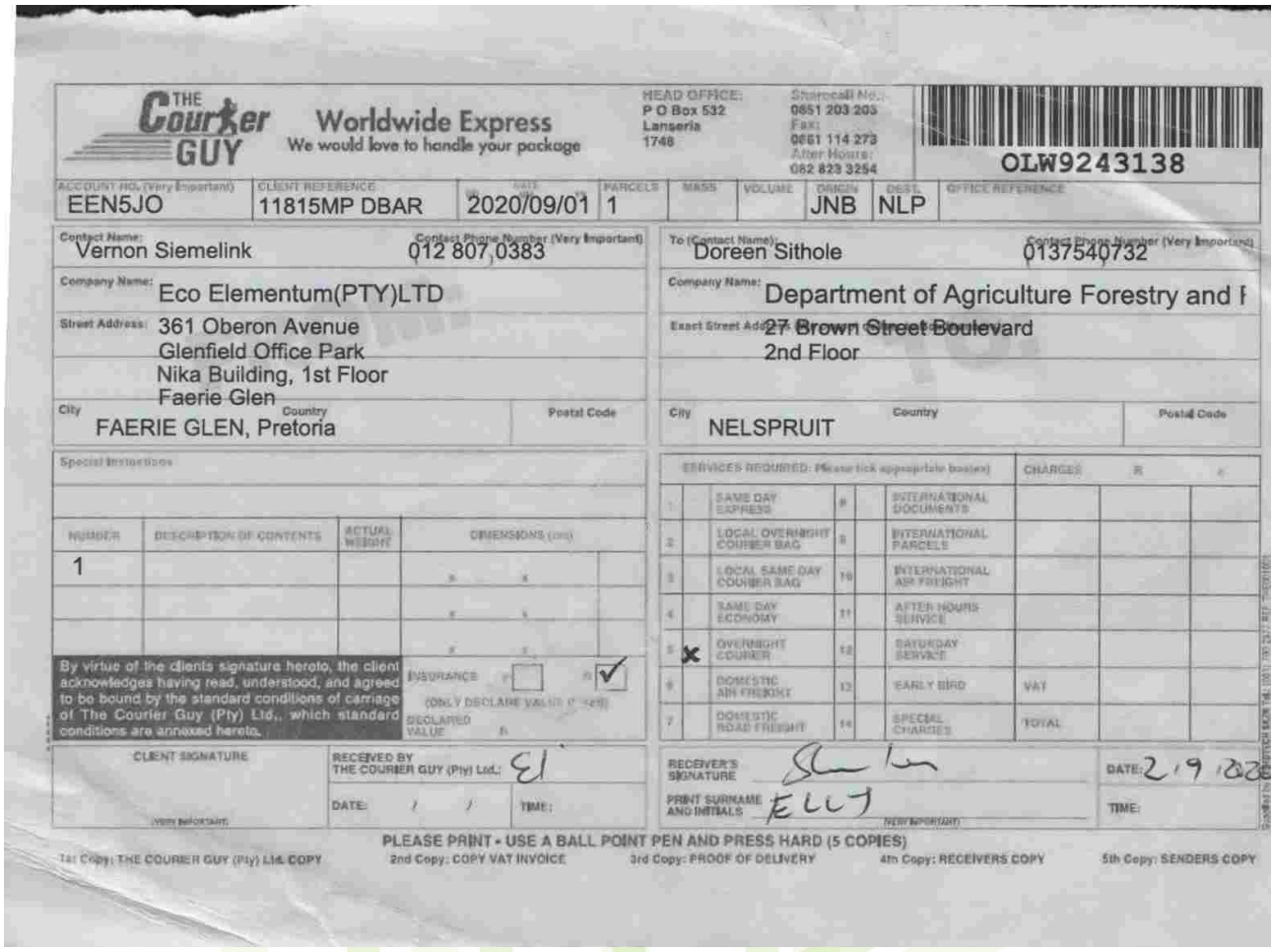

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ACCOUNT NO. (Very Important)	CLIENT REFERENCE	DATE	PARCELS	MASS	VOLUME	ORIGIN	DEST.	OFFICE REFERENCE
EEN5JO	11815MP DBAR	2020/09/01	1			JNB	NLP	

Contact Name: Vernon Siemelink
Contact Phone Number (Very Important): 012 807 0383
Company Name: Eco Elementum(PTY)LTD
Street Address: 361 Oberon Avenue
Glenfield Office Park
Nika Building, 1st Floor
Faerie Glen
City: FAERIE GLEN, Pretoria
Country:
Postal Code:

To (Contact Name): Doreen Sithole
Contact Phone Number (Very Important): 0137540732
Company Name: Department of Agriculture Forestry and F
Exact Street Address: 27 Brown Street Boulevard
2nd Floor
City: NELSPRUIT
Country:
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7		DOMESTIC ROAD FREIGHT	14		SPECIAL CHARGES	TOTAL		

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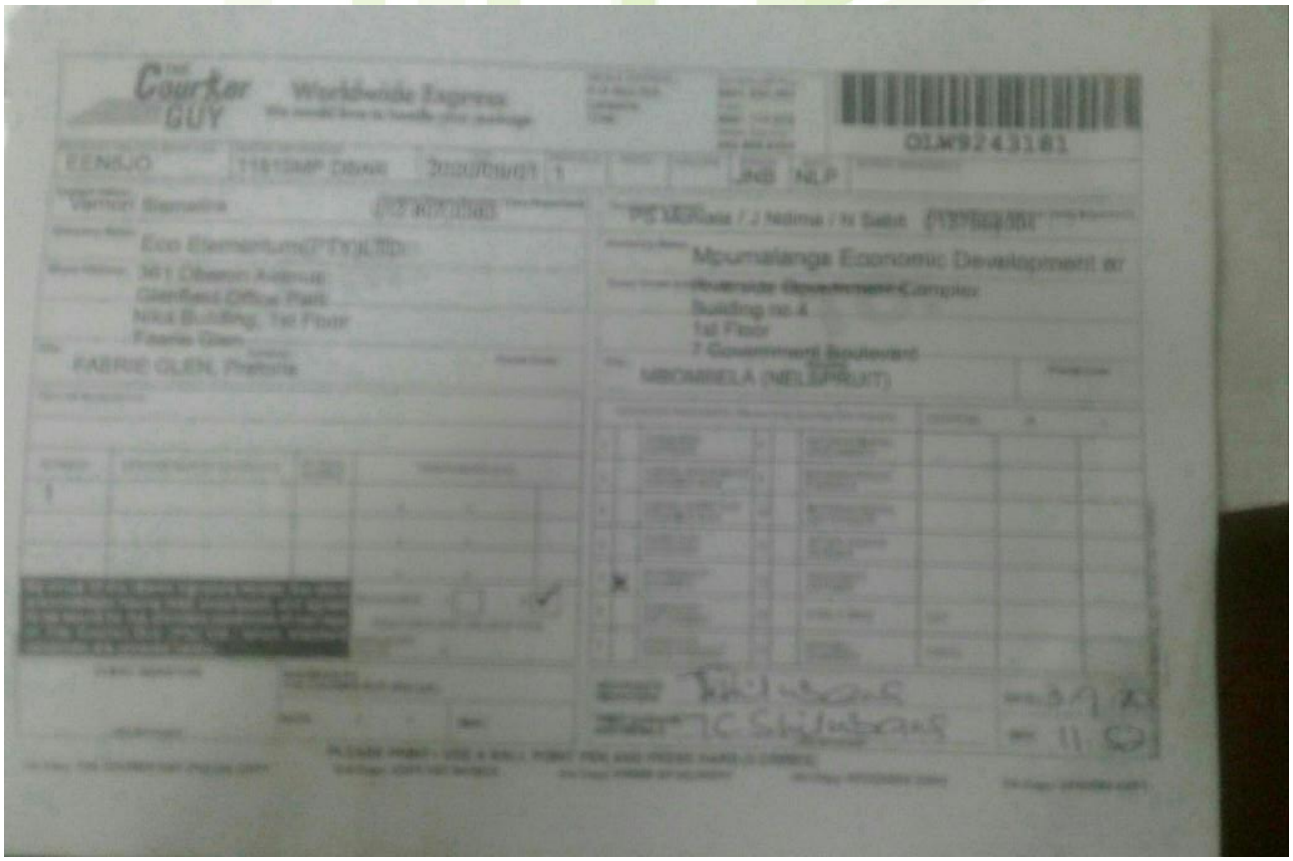

3.h.iii Summary of issues raised by I&APs

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

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES					
Landowner/s	x				
DORSTFONTEIN COAL MINES (PROPRIETARY) LIMITED		Landowner Access Agreement is in place and the latest amendment attached as an appendix			Appendix B
Lawful occupier/s of the land					Proof of Notification attached as Appendix B and Section 3.h.ii
Islardu Boerdery – Ronel Bekker	x	No comments received to date			
Mr Charl du Plessis	x	No comments received to date			
Landowners or lawful occupiers on adjacent properties					Proof of Notification attached as Appendix B and Section 3.h.ii
No comments received to date					
Municipal councillor					
Municipality	x				
Erald Nkabinde - eMalahleni Local Municipality	x	02/10/2020 Formal Letter via Email	The Draft BA report entails the proposed mining of coal in respect of portion of the remaining extend the farm Vlaklaagte 45 IS. The project intends to conduct opencast mining. The Directorate has reviewed the Draft BA report and has the following comments about the report: 1. Applicable legislation The draft BA report is not exhaustive on the list of applicable policy and legislations consulted when drafting the report. The Municipal by-laws have not been considered. In the final BA report, please consider including the following by-laws: -Emalahleni Local Municipality Solid Waste Management by-law, No.2632, 13 January 2016.	The bylaws mentioned have been considered and included in the updated report for the Authorities	Section 3.e

			-Emalahleni Local Municipality Noise Control by-laws, No.2632. 13 January 2016. -Emalahleni Local Municipality Air Quality Management By-laws, No.2760. 21 September 2016.		
			2. Rivers and Wetlands The specialist suggested delineated wetland buffer of 50m does not include the wetland that extends into the mining area, why is that?	The wetland within the mining area is considered severely modified and does not serve any function as a wetland due to the agricultural activities within it. It is therefore considered a historic wetland. The 50m buffer is assigned to the functional wetland area.	Section 3.h.iv.1 And Appendix D
			3. Heritage Impact Assessment Please submit a letter from SAHRA confirming that the proposed mining area is of no heritage importance.	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT was undertaken for the proposed project, and submitted to SAHRA. "No sites of heritage importance were observed within the demarcated boundary on the Remaining Extent of the Farm Vlaklaagte 45 IS. Historical topographical maps verified that the area was used for crop cultivation since at least 1962 and that no structures appear to have existed at that stage. No other material of heritage importance were observed within the demarcated study area. The study area is disturbed due to the presence of maize cultivation."	Section 3.h.iv.1 And Appendix D
			4. Blasting radius What is the distance from the proposed mining boundary to the nearest residential house? And also what is the distance from the proposed mining pit area to the nearest residential house?	The closest residential house is situated 1.43km to the east of the Mining Permit Boundary, and the pit area is 1.45km from this house.	Section 3.h.iv.1 And Appendix D
			5. Noise Due to the earmarked blasting as result of mining operations, please include a noise impact assessment report in the final report.	The opinion of a specialist has been included. Due to the distance from the nearest sensitive receptor and the presence of other operating mine houses in the area, the Noise impact is not expected to be of high significance.	Appendix D
			6. Air quality The applicant must have dust fallout monitoring points around the proposed mining area, and have the monitoring reports submitted to the Municipality on quarterly basis.	This comment is noted and a condition for inclusion in the Authorisation will be added.	Section 3.p.ii
			7. Land use application The proposed mining operations are earmarked in an area currently zoned "Agriculture", was a rezoning Application done?	This did not form part of Eco Elementum's Scope of work and the status of such an application is unknown.	N/A

			8. Complaints An incident and complains register must be present on site and submitted to the Municipality on quarterly basis.	This comment is noted and a condition for inclusion in the Authorisation will be added.	Section 3.p.ii
			Recommendations The proposed Trenta Pty Ltd mining is not supported based on the above comments. You're advised to review the comments and submit all relevant and additional information the comment raised, to allow the municipality to provide further comments.	Due to significantly low responses during the hight of the Covid pandemic, this report was made available for a second round of Public Review, and the EAP trusts that the comments have been adequately addressed.	N/A
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)	x				Proof of Notification attached as Appendix B and Section 3.h.ii
Transnet	No comments received to date				
Communities					
NA					
Dept. Land Affairs	x				
No comments received to date					
Traditional Leaders					
N/A					
Dept. Environmental Affairs	x				
No comments received to date					
Other Competent Authorities affected	x				Proof of Notification attached as Appendix B and Section 3.h.ii
No comments received to date					
OTHER AFFECTED PARTIES					
No comments received to date					
INTERESTED PARTIES					
No comments received to date					

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

3.h.iv.1 Baseline Environment

3.h.iv.1.a Type of environment affected by the proposed activity.

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

CLIMATE

The average daily maximum temperatures range from 17°C in June to 26°C in February, with nightly minimum ranging from 0.5°C in June to 13°C in January, February and December.

The average precipitation for the Vlaklaagte region is presented in Figure 3.13 (WRC, 2015). The average precipitation for the region is approximately 665 mm/a with the majority of the rainfall over the summer months between October and March. Rainfall within the Highveld region is mainly contributed by thunderstorms where a large quantity of rainfall occurs within a short period of time.

Evaporation data is scarce and generally old. From available data the average annual precipitation for the Vlaklaagte area is ± 1 700 mma/a.

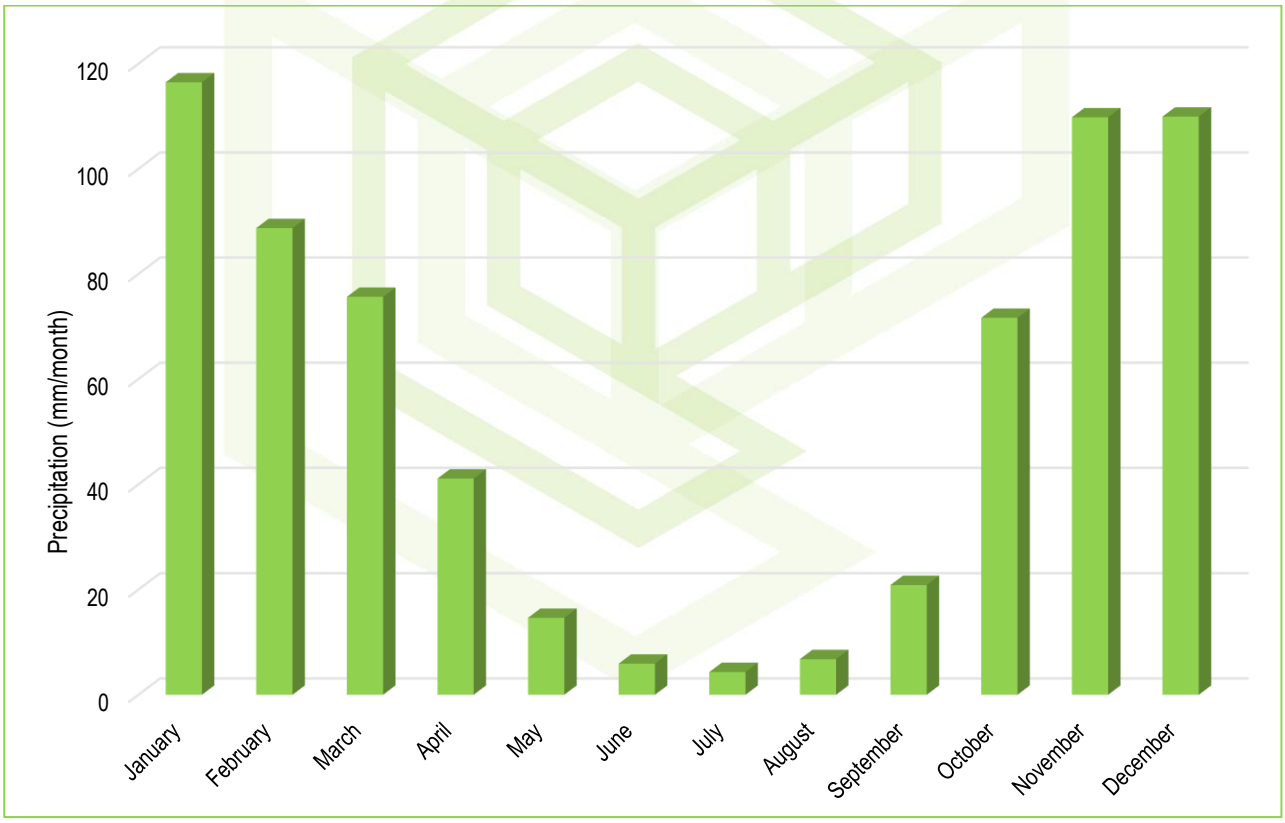

Figure 3.13: Monthly precipitation in the Vlaklaagte mining area (WRC, 2015)

GEOLOGY

Regional Geology

The following section on the regional geology have been extracted from the GCS, 2016 report.

All of the known coal deposits in South Africa are hosted in sedimentary rocks of the Karoo Basin, a large foreland basin which developed on the Kaapvaal Craton. The Karoo Supergroup is litho-stratigraphically subdivided into the Dwyka, Ecca and Beaufort groups.

Sediments of the Dwyka Group and the coal-bearing Ecca Group developed on an undulating pre-Karoo erosion surface consisting of granite of the Lebowa suite, considered as the basement rock.

The undulating nature of this surface has had a large influence on the thickness and depth of the deposited coals seams. The coal seams are usually separated by course to fine-grained sandstone, siltstone and/or shale at the top. Glauconitic sandstones, indicative of transgressive marine periods, are present above the No.4 and No.5 Seams. The coal zone is overlain by another deltaic sequence, which consists of sandstone and sandy micaceous shale and siltstone with varying thickness (approximately 60 to 100 m thick).

Fractures are common in rocks such as sandstone, shale and coal as part of the Karoo sediments. Dolerite intrusions, in the form of sills or dykes cause in some locations various mining problems (i.e. devolatised coal, weakened roof strata and/or displaced coal seams), where near vertical dykes have very little displacement associated transgression through the seam.

Sill transgressions, on the other hand, generally results in displacement of the coal seams and strata. The magnitude of these displacement being dependent on a number of factors, including sill thickness and presence / orientation of pre-existing zones of weakness. These intrusions introduce local structural complexity by displacing seams relative to one another and isolating blocks of coal.

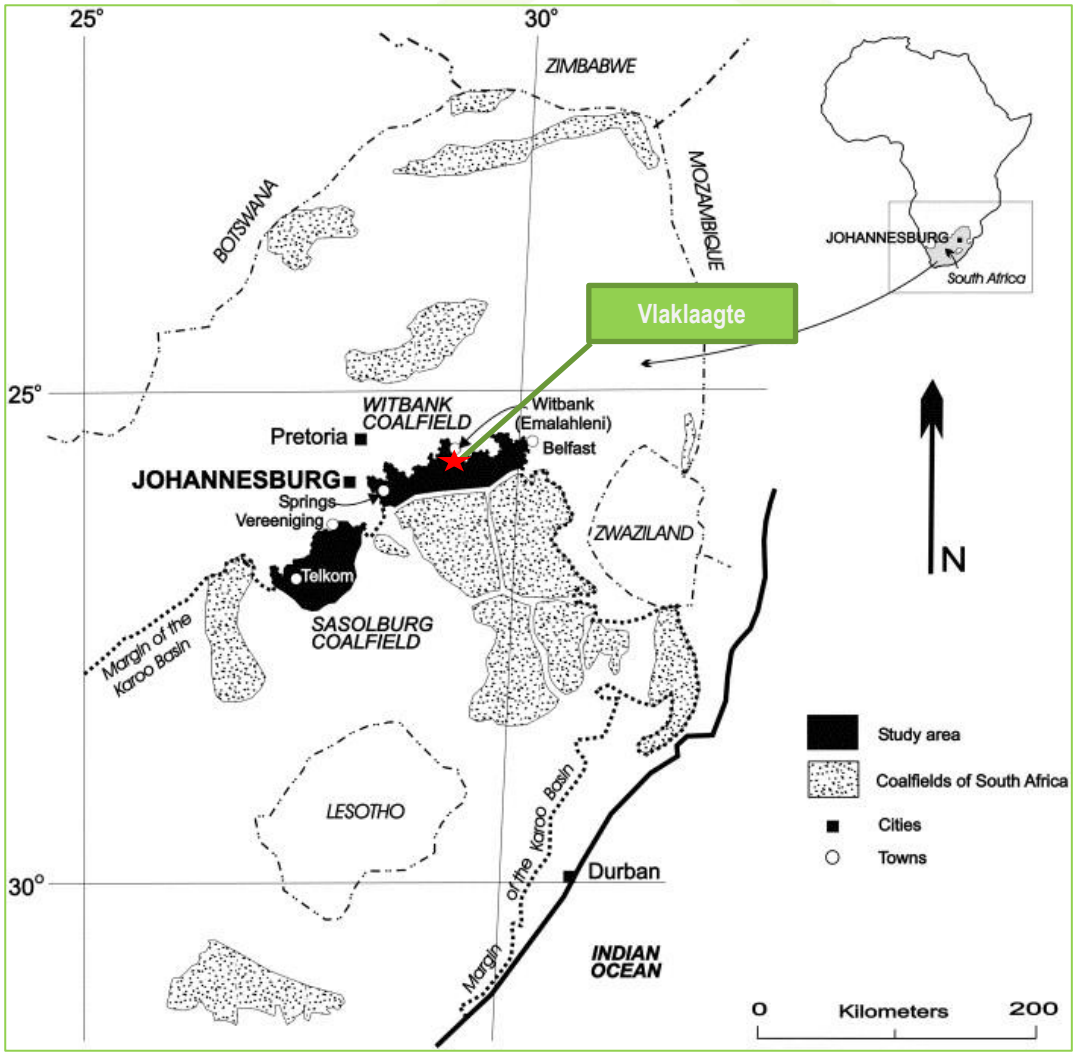

Figure 3.14: Witbank Coalfields and the position of Vlaklaagte mining in relation to it (Denis et.al., 2007).

FAUNA AND FLORA

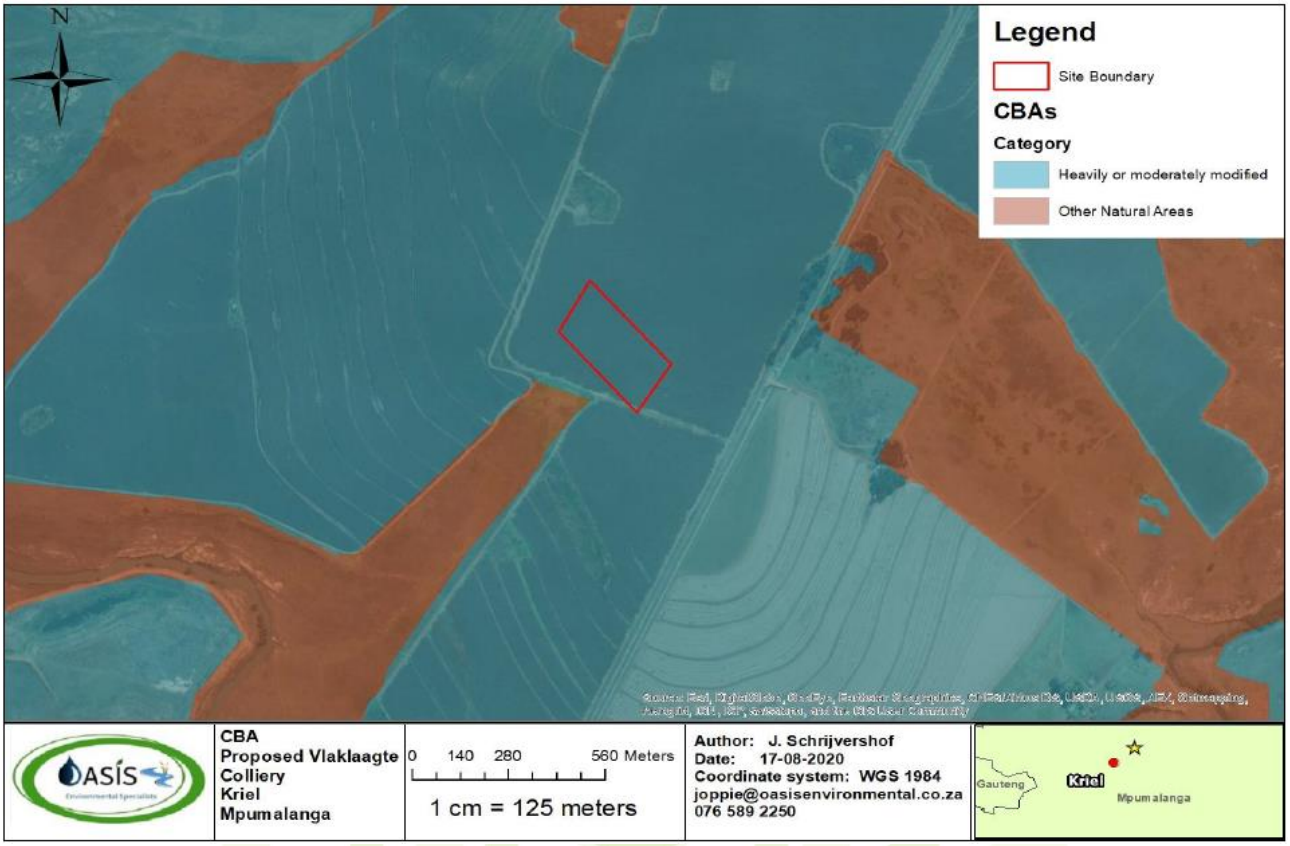

Figure 3.15: Critical Biodiversity Areas

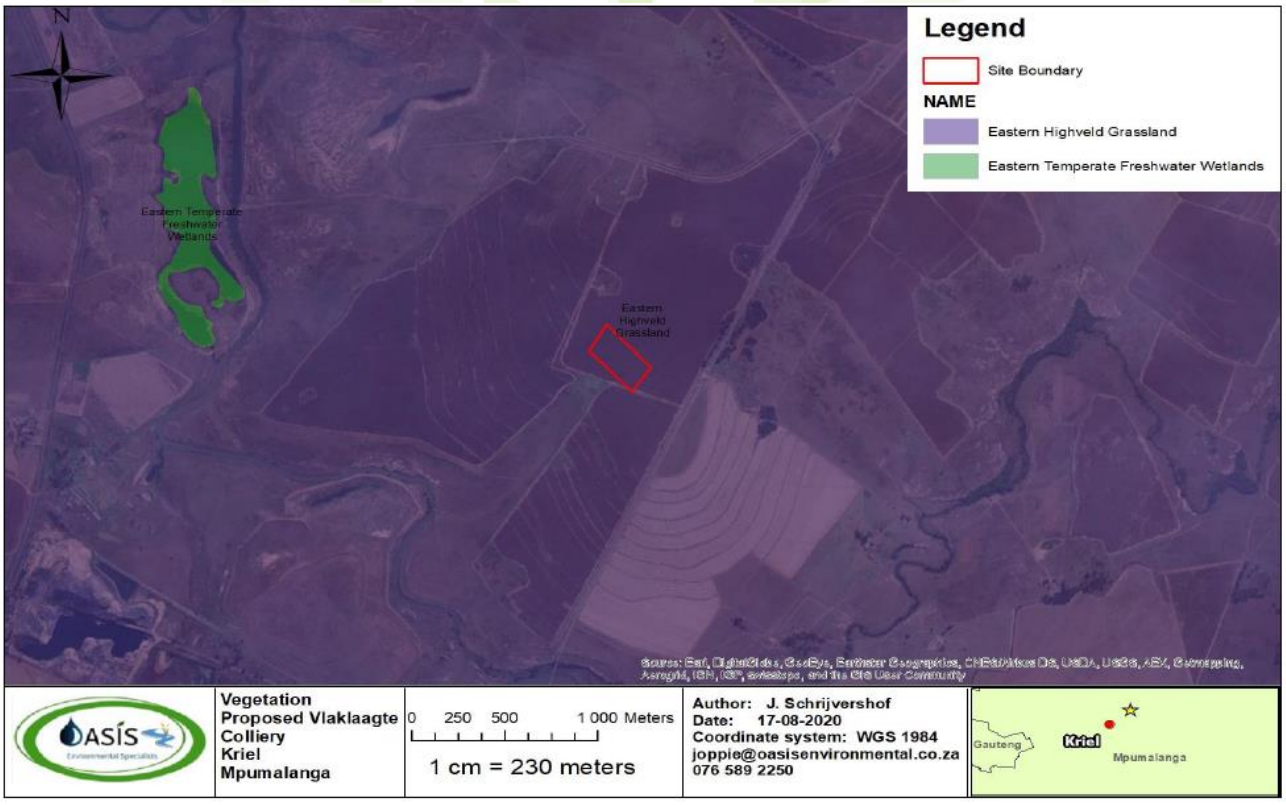

Figure 3.16: Vegetation according to Mucina and Rutherford, 2006

The majority of the study site consisted of alien invasive vegetation and very little indigenous vegetation. No red listed floral species were observed during the site visit.

Commonly observed grasses (dominant species) within the area of investigation comprised *Imperata cylindrica* (Cogon grass) *Hyparrhenia hirta* (Thatching grass) associate with the wetland areas. Common species observed within grassland habitat includes *Eragrostis curvula, Seriphium plumosum, Eragrostis chloromelas, Helichrysum nudifolium*, *Tagetes minuta, Bidens pilosa, Hermannia transvaalensis, Dicoma zeyheri, Eragrostis gummiflua and Hyparrhenia tamba* Beyond the reaches of the grasslands is extensive gumtree and black wattle invasion. *Seriphium* spp. encroached certain sections of the grassland areas.

Mammal species that were identified onsite included the African porcupine (*Hystrix africaeaustralis*), yellow mongoose (*Cynictis penicillata*) and ground squirrel (*Xerus* spp.). All these mammal species are listed as least concern by the IUCN red list. Bird species included Spotted thick-knee (*Burhinus capensis*), Helmeted guineafowl (*Numida meleagris*) Egyptian goose (*Alopochen aegyptiaca*). Other species included Laughing dove (*Spilopelia senegalensis*), Southern red bishop (*Euplectes orix*) and Southern masked weaver (*Ploceus velatus*).

No red listed faunal species were observed during the site visit.

WETLANDS AND AQUATICS

Two Seepage wetland systems (HGM 2 and HGM 3) and one Pan wetland (HGM 1) were identified within the study boundary (Figure 3.17). Seepage wetlands are characterised by their association with topographic positions that either cause groundwater to discharge to the land surface or rain derived water to seep down-slope as subsurface interflow. Water movement through the seep is primarily attributed to interflow, with diffuse overland flow often being significant during and after rainfall events (Kotze et al., 2008; Ollis et al., 2013).

Pan wetlands serve as small (deflationary) depressions which are circular or oval in shape; usually found on the crest positions in the landscape. The topographic catchment area can usually be well-defined (i.e. a small catchment area following the surrounding watershed). Although often apparently endorheic (inward draining), many pans are “leaky” in the sense that they are hydrologically connected to other wetland or river systems through subsurface diffuse flow paths (Rountree et al., 2007).

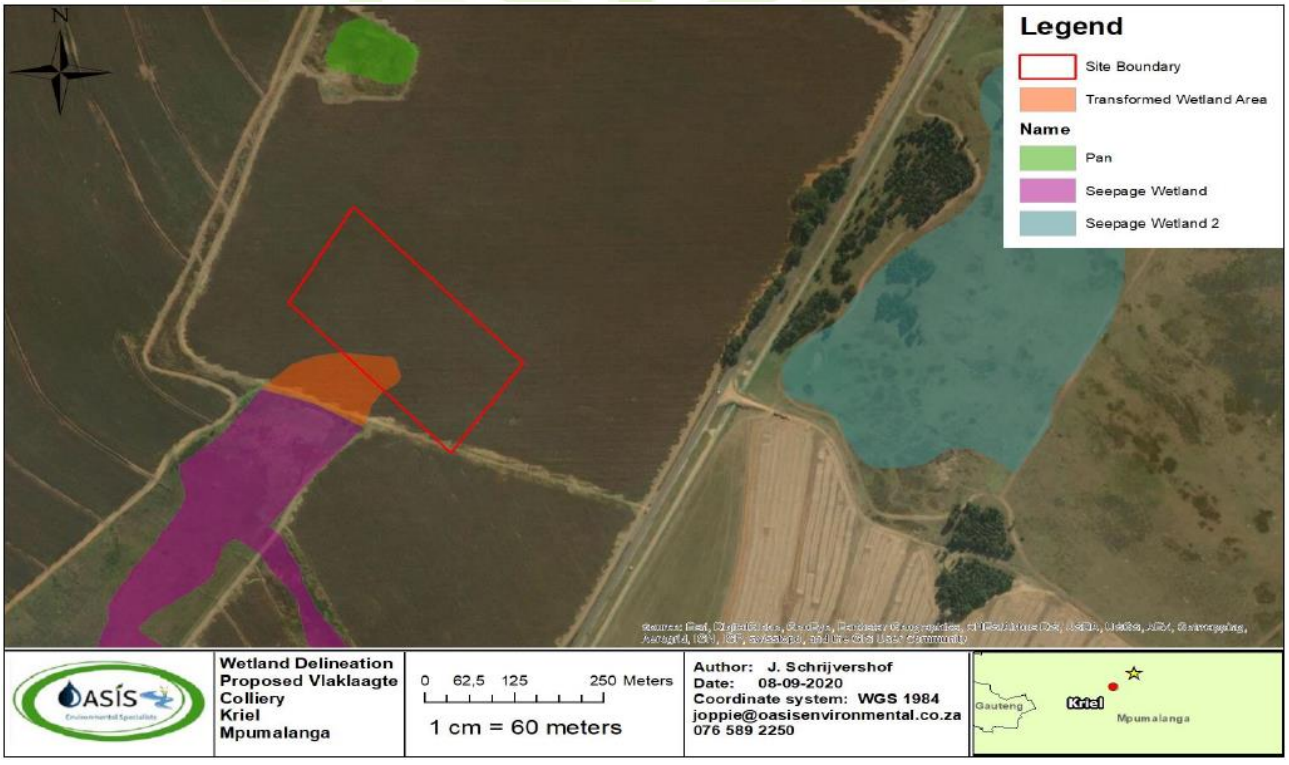

Figure 3.17: Wetland delineation

The Ecological Sensitivity and Importance (EIS) of the wetlands has generally been recorded as moderate to low and the Ecological Services as intermediate. Although no red-data species were identified during the site investigation, the majority of channelled valley bottom systems usually, provide habitat for a number of floral and faunal species.

According to the functional assessment flood attenuation; sediment trapping; erosion control; the maintenance of biodiversity; and the provision of natural resources are the predominant attributes provided by these wetlands to the surrounding landscapes.

The pan wetland system (HGM 1) was assessed in terms of health and was found to be categorised as seriously modified (Category E) (Table 3.7). Modifications to the systems and the resultant effect on the health of the wetlands is predominantly related to the extensive cultivation and extensive alien invasive vegetation and erosion. The seepage wetland (HGM 2) between the proposed project and Olifants River was rated as Largely Modified (Category D).

The seepage wetland east (HGM 3) of the proposed project was rated as Moderately Modified (Category C) as result of less disturbances compared to the other two wetland units in proximity to the projects area (Figure 19).

Table 3.7: Summery of PES scores

Module	HGM Unit 1			HGM Unit 2			HGM Unit 3		
	Impact Score	Category	Trajectory	Impact Score	Category	Trajectory	Impact Score	Category	Trajectory
Hydrology	6,2	E	↓	5,2	D	↓	3,9	C	↓
Geomorphology	6,6	E	↓	5,7	D	↓	4,5	D	↓
Vegetation	6,3	E	↓	4,3	D	↓	3,3	C	↓
Overall Score	**6,37**	**E**	↓	**5,07**	**D**	↓	**3,90**	**C**	↓

Extensive crop farming has had a negative impact on the basal cover of vegetation within the catchments associated with the pan wetland. This results in a negative impact on the wetlands ability to maintain biodiversity.

Despite the modified nature of the seep wetlands they still provide a number of functions to the larger landscape, particularly with regard to flood attenuation; sediment trapping; erosion control; the maintenance of biodiversity; and the provision of natural resources.

HYDROGEOLOGY

Unsaturated Zone

The unsaturated zone is the zone between the ground surface and the static water table. In the unsaturated zone the pores between the ground particles are filled with air and water- thus below saturation. Static water levels in the region of the 2 Seam Vlaklaagte mining areas obtained from the GCS (2017) report, generally range from less than 1 to15 mbs, therefore also the thickness of the unsaturated zone. These levels, under steady state conditions, can also be expected at the proposed Trentra Vlaklaagte mining area. The unsaturated zone may consist of soil, weathered bedrock and even solid bedrock from the sandstone and shale of the Ecca Group.

Saturated Zone

The saturated zone is that part of the aquifer below the regional static water level where all pores and fractures are filled with water at a pressure greater than atmospheric pressure. The depth of the saturated zone in the Trentra Vlaklaagte mining area, is therefore from ±1 to 15 mbs. From the GCS 2017 study and other studies in the region of the proposed Trentra Vlaklaagte mining area, the saturated zone mainly consists of two aquifer systems.

- Firstly, the weathered, unconfined aquifer that typically occurs on the transition between soil and weathered bedrock (typically sandstone and shale). The groundwater flow closely mimics the surface topography. Groundwater levels are usually shallow in the low lying topographical regions and may even daylight on surface which is referred to as springs. The weathered aquifer is more prominent in the wet season because it is located on top of solid bedrock or clayey layers. This aquifer normally has a low yield.
- The second aquifer is known as the deeper, confined aquifer. Flow in this aquifer mainly occurs along fractures, bedding planes and other groundwater flow paths. The presence of fractures generally decreases with depth in this aquifer. The secondary

aquifer, due to its heterogeneous nature, may be higher yielding than the weathered aquifer. Due to longer residence time of the groundwater in this aquifer, the salt load may be higher than that of the weather aquifer.

A third aquifer at great depth may occur within the pre-Karoo geology (Transvaal Group), underlying the Dwyka-tillites. Very little information of this aquifer in the area is available since very few boreholes have been drilled to this great depth. The water quality and quantity in this aquifer may be inferior to that of the overlying Karoo aquifers

Groundwater Levels

Groundwater level information is available for the area as they were recorded during the GCS study in 2016. Groundwater levels generally varied from less than 1 to 15 mbs in the boreholes recorded during the hydrocensus and the monitoring boreholes. Some deeper levels were observed but the majority of these levels were boreholes equipped with pump equipment which indicates that the levels may be affected by dewatering.

Table 3.8: Summary of water levels in the boreholes used as calibration points in the numerical model.

Borehole ID	X-coord	Y-coord	Surface Elevation (mamsl)	Static Water Level (mbs)	Water level Elevation (mamsl)
IN02	37311	-2896147	1540	4,3	1535,7
MAH1	34562	-2894567	1538	5,9	1532,1
MAH2S	34537	-2894561	1537	5,2	1531,8
MAH2M	34537	-2894561	1537	5,2	1531,8
MAH2D	34537	-2894561	1537	6,2	1530,8
ND1	38128	-2897564	1552	2,0	1550,0
DFTNM12	32442	-2898525	1600	10,3	1589,8
Well1	37765	-2895820	1558	0,7	1557,4
FFGM15	37550	-2895690	1552	0,9	1551,1
NBH5	35648	-2896634	1571	8,6	1562,4
NBH5A	35650	-2895750	1543	11,7	1531,3
WSBH2	32375	-2897158	1599	21,9	1577,1
NBH21	32314	-2897377	1598	15,2	1582,8
NBH22	32194	-2897379	1599	20,6	1578,4
NBH24	31149	-2898062	1614	13,2	1600,8
BHU1	32298	-2897254	1604	6,9	1557,2
D12	35665	-2896635	1565	3,1	1561,9
BH1	33264	-2894197	1552	5,71	1546,0
BH2	35094	-2896316	1557	15,71	1540,8
BH3	35096	-2895814	1536	8,08	1527,9
BH4	33871	-2895810	1544	6,48	1537,7
BH5	35366	-2895783	1544	17,96	1526,1

The groundwater level elevations correlate very well with the topography – 95% **(Figure 3.**19**)**, which is typical of the Karoo aquifers. Due to extensive mining in the mining area over recent years, the water levels may have decreased in the near vicinity of the coal mining activities.

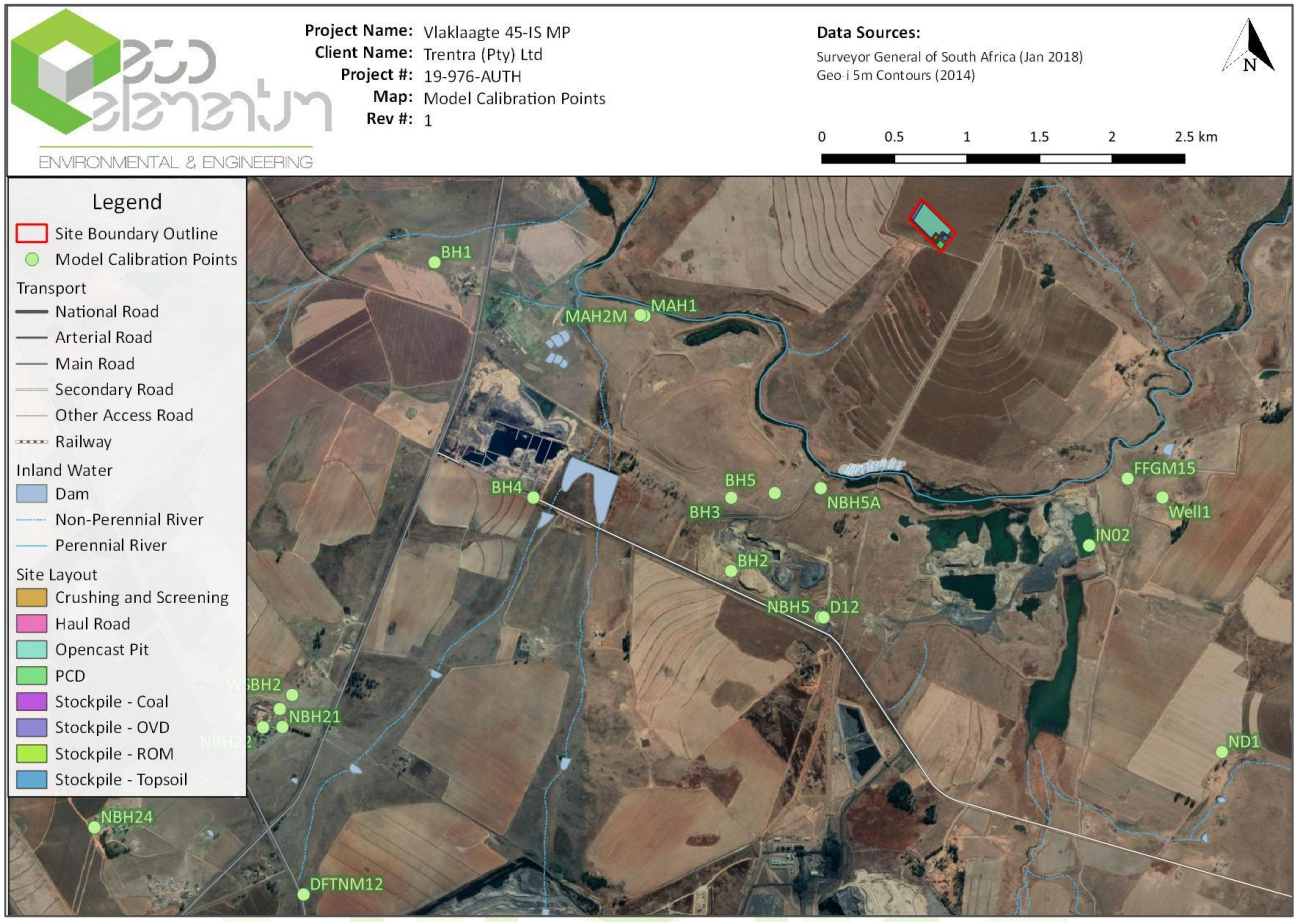

Figure 3.18: Model Calibration Points for the Trentra Vlaklaagte mining area.

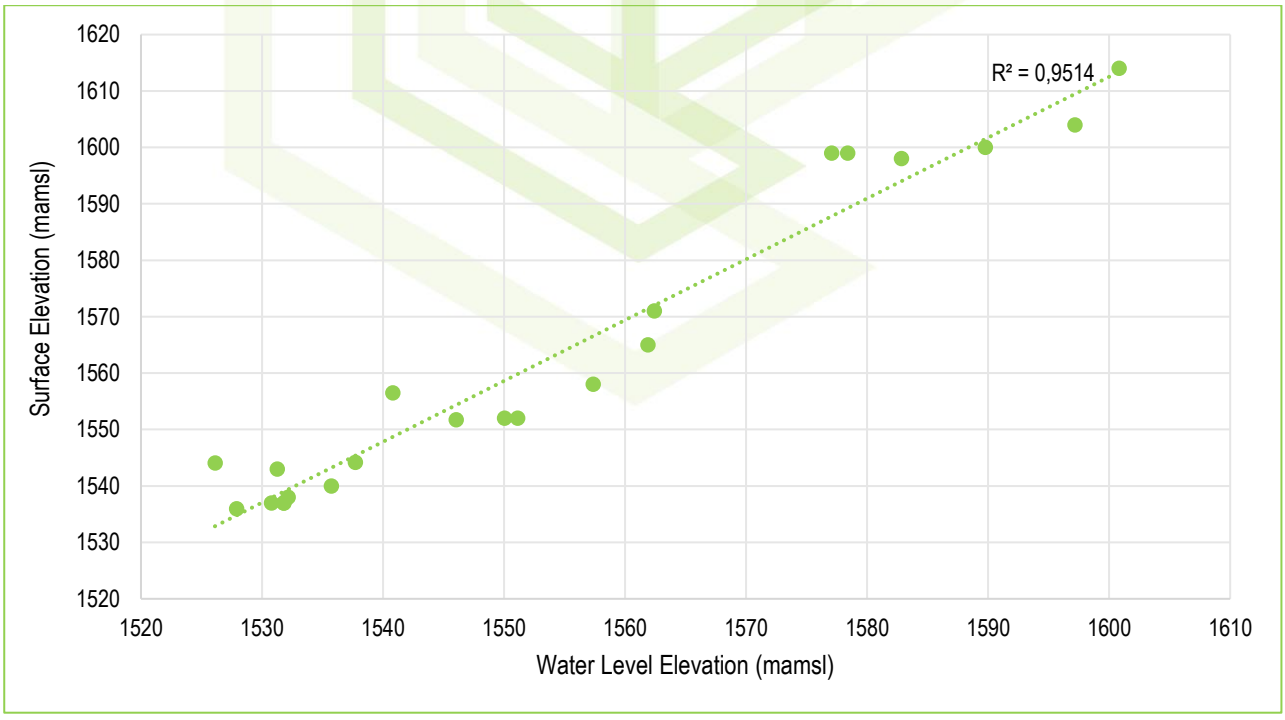

Figure 3.19: Correlation between groundwater level elevations and topography.

Groundwater Potential Contaminants

Acid generation is a common response to the coal mining environment. Coal and carbonaceous material contain a mineral known as pyrite, an iron-sulphide mineral, which is the main contributor to acid rock drainage (ARD). After being exposed to oxygen and water the sulphide minerals react to form an acid. Bacteria, which increases with the exposure to water and oxygen often accelerates the acidification process. The reaction can however also occur abiotically.

The general equation of pyrite oxidation is as follows:

$$2FeS_2 + 7O_2 + 2H_2O \rightarrow 2Fe^{2+} + 4SO_4^{2-} + 4H^+$$

Ferrous iron is oxidised to ferric iron:

$$4Fe^{2+} + O_2 + 4H^+ \rightarrow 4Fe^{3+} + 2H_2O$$

As mentioned previously these two reactions can occur abiotically or with the catalisation by micro-organisms. These organisms arise from the oxidation reactions. The ferric cations reduce to ferrous ions:

$$FeS_2 + 14Fe^{3+} + 8H_2O \rightarrow 15Fe^{2+} + 2SO_4^{2-} + 16H^+$$

The release of H+ lowers the pH. At the lower pH the solubility of the ferric ion continuous which increases the acid generation.

Acid Generation Capacity

ABA tests were conducted during the GCS (2016) study. This section of the report will summarise the finding of the GCS, 2016 report. The ABA classification guidelines are described in **Table 3.**10. .

Table 3.9: ABA Classification Guidelines.

	Potentially Acid Generating	Uncertain/Marginal	Non-acid Generating
Paste pH	<5.5	-	>5.5
NNP	<-20	-20 to 20	>20
NPR	<1	1 to 3	>3
S%	>0.3%	-	<0.3%
NAG	>0.1	-	<0.1
Rock Type	I	II	III

- ***Notes:***
  - *NNP: Net Neutralizing Potential,*
  - *NPR: Neutralisation Potential Ratio,*
  - *NAG: Net Acid Generation,*
  - *S%: Total Sulphur.*

Table 3.10: Results of the ABA tests (GCS, 2016).

Lithology	Paste pH	Total %C	Sulphide %S	AP CaCO3 kg/t	NP CaCO3 kg/t	NNP CaCO3 kg/t	NP:AP	Rock Type NNP	Rock Type %S	Rock Type NP:AP
Carbonaceous mudstone/shale	7,73	24,9	0,274	8,58	30,3	21,7	6,43	III	III	III
Coal	7,38	58,2	1,49	46,7	25,7	-21	0,78	I	I	I
Sandstone / Mudstone	7,65	10,4	0,317	9,92	17,54	7,62	2,47	Uncertain	I	III
Weathered sandstone and clay	6,41	9,92	0,12	3,73	5,2	1,47	1,39	Uncertain	III	III

The NAG test provides a direct assessment of the potential for a material to produce acid after a period of exposure (to a strong oxidant) and weathering. The test can be used to refine the results of the ABA predictions. In the Net-acid Generating (NAG) test hydrogen peroxide (H_2O_2) is used to oxidize sulphide minerals in order to predict the acid generation potential of the sample.

Table 3.11: NAG test screening method (GCS, 2016)

Rock Type	NAG pH	NAG Value (H_2SO_4 kg/t)	NNP ($CaCO_3$ kg/t)
Ia High Capacity Acid Forming	< 4.5	> 10	Negative
Ib Lower Capacity Acid Forming	< 4.5	≤ 10	-
Uncertain, Possibly Ib	< 4.5	> 10	Positive
Uncertain	≥ 4.5	0	Negative (Reassess mineralogy)*
IV Non-acid Forming	≥ 4.5	0	Positive

** if low acid forming sulphides is dominant then Rock Type IV*

Table 3.12: Net acid generation (NAG) test results

Sample	NAG pH: (H_2O_2)	NAG (kg H_2SO_4/t)	NNP ($CaCO_3$ kg/t)	Rock Type
Carbonaceous Shale 1	4.98	0	11.90	IV
Carbonaceous Shale 2	4.6	0	9.05	IV
Coal 1	5.01	0	-2.45	Uncertain
Sandstone/slightly carbonaceous mudstone	4.08	1.54	16.10	Ib
Coal 2	2.67	8.31	-17.40	Ib

The potential for the material sampled to generate acid mine drainage are summarized as follow (GCS, 2016):

- 33.3% of the carbonaceous mudstone/shale samples collected has a high potential to generate acidic drainage (and will generate a high salt load), 17% has a low potential to generate acidic drainage (and will generate a low to medium salt load), 17% has a very low potential to generate acidic drainage (and will generate a very low to medium salt load), 33.3%) of the carbonaceous mudstone/shale samples collected has no potential to generate acidic drainage (and will generate no salt load);
- 100% of the coal samples collected has a high potential to generate acidic drainage (and will generate a high salt load);
- 50% of the shale samples collected has a very high potential to generate acidic drainage (and will generate a very high salt load), 50% has a very low potential to generate acidic drainage (and will generate a very low salt load);

- 25% of the sandstone/mudstone samples collected has a high potential to generate acidic drainage (and will generate a high salt load), 38% has a low to medium potential to generate acidic drainage (and will generate a medium to high salt load), 17% has a low potential to generate acidic drainage (and will generate a low to medium salt load), 17% has a very low potential to generate acidic drainage (and will generate a very low to medium salt load) 13, 13% of the sandstone/ mudstone samples collected has no potential to generate acidic drainage (and will generate no salt load); and
- 100% of the soil and clay samples collected has low potential to generate acidic drainage (and will generate a low to medium salt load);
- Overall it can be concluded that about 50% of the overburden/waste rock material (weathered sandstone, clay, sandstone, mudstones, carbonaceous mudstone and carbonaceous shales) have potential to generate acidic drainage if the material is oxidised and leaching occurs subsequently. The coal samples have a high potential to generate acidic drainage if subjected to oxidisation. Usually the coal is mined before significant oxidation occurs and only coal remaining in the mine will potentially be of concern over the long-term.

Waste Classification

A waste classification should be conducted in accordance with the National Environmental Management: Waste Act (NEM: WA) Regulations (2013). The assessment is undertaken by comparing the samples' leachate concentration (LC) to the leachable concentration threshold (LCT), and the total concentration (TC) to the total concentration thresholds (TCT). The results will indicate the type of waste and the type of liner, if any, required for the potential source.

Generally, the results below are expected for the coal mining environment. Please note that these are only indicative and may differ from site to site.

- Coal material:
    - The coal samples are generally classed as Type 3 waste (hazardous) and according to the NEM: WA guidelines should be disposed of at a Class C landfill site or a site designed with the liner requirements as shown in Figure 3.20; and
    - The short-term storage of the coal material on stockpiles and good storm water management should ensure that environmental impacts are kept to a minimum and contained to the stockpile sites. Based on these management protocols the liner illustrated in **Figure 3.**20 should be sufficient, however the decision lies with the Department of Environmental Affairs.
- Waste rock material:
    - Waste rock are generally also classed as Type 3 waste and should be disposed of at Class C landfill sites or sites designed with liner requirements illustrated in **Figure 3.**20.

Table 3.13: Waste Classification Criteria

Waste Type	Disposal
0	Not allowed
1	Class A or Hh:HH landfill
2	Class B or GLB+ landfill
3	Class C or GLB- landfill
4	Class D or GLB- landfill

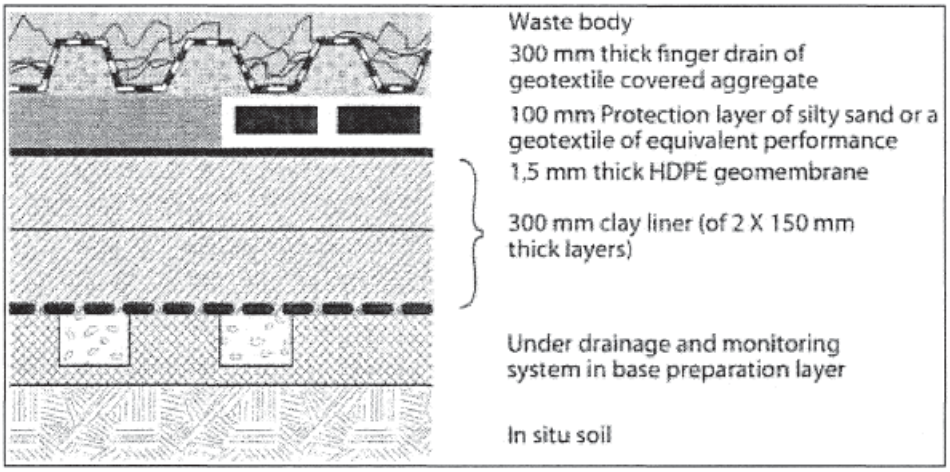

Figure 3.20: Class C landfill site liner requirements.

Groundwater Quality

Groundwater quality information is available from the mining areas in close proximity of the mining area. These include 2 Seam Colliery south of the proposed Trentra Vlaklaagte mining area (GCS, 2017), as well as the Exxaro Dorstfontein West mining area (GCS, 2019) - Figure 3.21. The Dorstfontein West hydrocensus borehole qualities are indicated in Table 3.14 while the 2 Seam Colliery hydrocensus and monitoring boreholes qualities are indicated in Table 3.15 (GCS, 2017).

The groundwater qualities in the majority of the hydrocensus boreholes were good. Some elevated nitrate concentrations were observed in the 2019 hydrocensus boreholes WSBH1 and NBH4 where the concentrations exceeded the permissible limits for drinking water. Manganese in NBH5A (Table 3.15) exceeded the permissible limits for drinking water in 2017.

Some of the mine monitoring boreholes from 2 Seam Colliery, south of the proposed Trentra Vlaklaagte mining area, indicated some impacts from mining activities with elevated sulphate concentrations in some of these boreholes (Table 3.15). The sulphate concentration in BH5 exceeded the maximum permissible limits for drinking water together with the EC and nitrate concentrations in this borehole.

The available water quality information was all south of the proposed Trentra Vlaklaagte mining area, south of the Olifants River. No quality information is available within 1km of the proposed mining area. It is also noted that no known mining activities is situated within 1km of the proposed mining operation and it is therefore not expected that the groundwater in the region of the proposed mining area will be impacted in terms of sulphate and mining related contamination. The proposed mining area is situated in an agricultural area. Agricultural activities may influence the groundwater qualities, but since no quality information for this site is available, no comments can be made in terms of agriculture.

Figure 3.21: Exxaro Dorstfontein West hydrocensus borehole positions.

Table 3.14: Groundwater qualities for the Exxaro Dorstfontein West hydrocensus boreholes (GCS, 2019).

	SANS 241-1:2015 Drinking Water Standard	NBH24	RK1	WSBH2	WSBH1	DFTNM12	NBH4	DFTNM4	DFTNM3	D4	D4a
pH Value @ 20°C	5-9.7 O	7,84	7,05	7,43	6,3	7,4	7,63	8,09	7,89	7,45	7,75
Conductivity mS/m @ 25°C	170	38,2	31,7	31,1	46,5	37,2	48,8	34,9	28,7	52,4	38,8
Total Dissolved Solids	1200	274	250	257	384	294	365	263	207	408	300
Calcium, Ca	NS	14,3	16,1	27,1	30,6	14,2	22,8	22,9	16,6	64,7	39,6
Magnesium, Mg	NS	6,84	9,4	11	20,5	10,6	37,6	9,6	11,6	24,6	13,2
Total Hardness as CaCO3	NS	64	79	113	161	79	212	97	89	263	153
Sodium, Na	200	62,6	22,1	27,6	39,7	57,5	7,69	41,7	40,1	27,2	38
Potassium, K	NS	5,78	9,8	5,84	9,76	5,47	3,24	3,16	2,02	2,57	3,27
Total Alkalinity as CaCO3	NS	174	85	69	12	180	110	173	177	234	194
Bicarbonate, HCO3	NS	173	85	69	12	180	109	171	175	233	193
Chloride, Cl	300	28,5	20,8	64,7	94,3	14,6	17,1	7,43	9,48	21,3	18
Sulphate, SO4	500	<0,141	1,57	34,7	22,4	21,7	75	16,5	<0,141	80,1	40,7
Nitrate as N	11	2,48	10,2	0,664	**24,7**	0,542	**12,2**	0,345	0,293	0,832	0,352
Nitrite as N	0.9	0,05	0,06	0,07	0,07	0,07	0,06	0,08	0,07	0,07	0,1
Ammonium, NH4	NS	0,09	0,06	0,02	0,02	0,03	0,07	0,23	0,19	0,03	0,48
Fluoride, F	1.5	0,51	<0,263	0,28	<0,263	0,4	<0,263	<0,263	1,05	<0,263	0,33

	SANS 241-1:2015 Drinking Water Standard	NBH24	RK1	WSBH2	WSBH1	DFTNM12	NBH4	DFTNM4	DFTNM3	D4	D4a
Iron, Fe	2	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004
Aluminium, Al	0.3	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002
Copper, Cu	2	0,098	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002
Chromium, Cr	NS	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003	<0,003
Orthophosphate as PO4	NS	<0,005	0,05	<0,005	<0,005	<0,005	<0,005	0,013	<0,005	<0,005	<0,005
Lead, Pb	0.01	0,01	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004
Arsenic, As	0.01	<0,006	<0,006	<0,006	<0,006	<0,006	<0,006	<0,006	<0,006	<0,006	<0,006
Selenium, Se	0.04	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002
Mercury, Hg	0.006	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004
Barium, Ba	0.7	0,201	0,171	0,352	0,476	0,111	0,076	0,385	0,65	0,102	0,099
Antimony, Sb	0.02	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001
Nickel, Ni	0.07	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002
Manganese, Mn	0.4	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001
Cadmium, Cd	0.003	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002	<0,002

Table 3.15: Groundwater qualities for the 2 Seam Colliery hydrocensus and monitoring boreholes (GCS, 2017).

	SANS 241-1:2015 Drinking Water Standard	D12	NBH5	NBH5A	NBH23	NBH24	BH1	BH2	BH3	BH4	BH5
pH Value @ 20°C	5-9.7	8	8,1	7,5	7,8	8	8,1	7,2	7,61	7,21	8,05
EC mS/m @ 25°C	170	42	19,8	75,1	40,2	33	24,4	27,6	117	14,7	297
Total Alkalinity as CaCO3	NS	233	110	208	186	85,6	115	98,8	303	59,3	357
Calcium, Ca	NS	34,7	14,5	61,2	15,2	18,4	17,3	28	93,1	9,59	284
Magnesium, Mg	NS	31,2	12,2	50,7	7	9,9	13,3	10,9	63	5,18	167
Sodium, Na	200	13,5	9,4	44,2	71,8	24,8	13,7	17,5	89,3	11,6	181
Potassium, K	NS	2	5,5	4,8	4,2	9,3	9,21	3,87	4,36	3,65	13,6
Chloride, Cl	300	4,3	4,8	7	29,9	20,3	11,2	8,02	18,2	5,49	97,6
Sulphate, SO4	500	11,2	3,8	244	2,9	4,3	11,4	52,4	410	1,79	1172
Nitrate as N	11	0,3	1,1	0,5	2,7	10,9	0,198	0,448	0,197	1,48	75,5
Iron, Fe	2	<0,004	0,11	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004	<0,004
Manganese, Mn	0.4	<0,001	<0,001	0,83	<0,001	<0,001	0,13	0,15	0,1	0,054	0,352
Fluoride, F	1.5	0,275	<0,263	0,566	0,603	<0,263	0,398	0,269	0,586	0,385	0,603

Groundwater Elevation And Gradient

Steady state flow model calibration involves the varying of aquifer parameters in the model until the observed water levels correlates well with the measured water levels. The measured water levels must represent the levels prior to any impacts from mining activities. Steady state water levels therefore represent "reality" prior to changes caused by mining activities.

Water level elevations used for steady state model calibration was obtained from geohydrological studies conducted in the area (Figure 3.23).

By adjusting the aquifer parameters in the model to the values indicated in **Error! Reference source not found.**, a very good correlation o f 95% were obtained (**Figure 3.**22). Due to the heterogeneous characteristics of the aquifer, over or under estimation of the water levels can be possible.

Groundwater within the Trentra Vlaklaagte mining model area decrease from approximately 1 720 mamsl (South-east of the Trentra Vlaklaagte mining area) to 1 507mamsl north-west of the mine area (

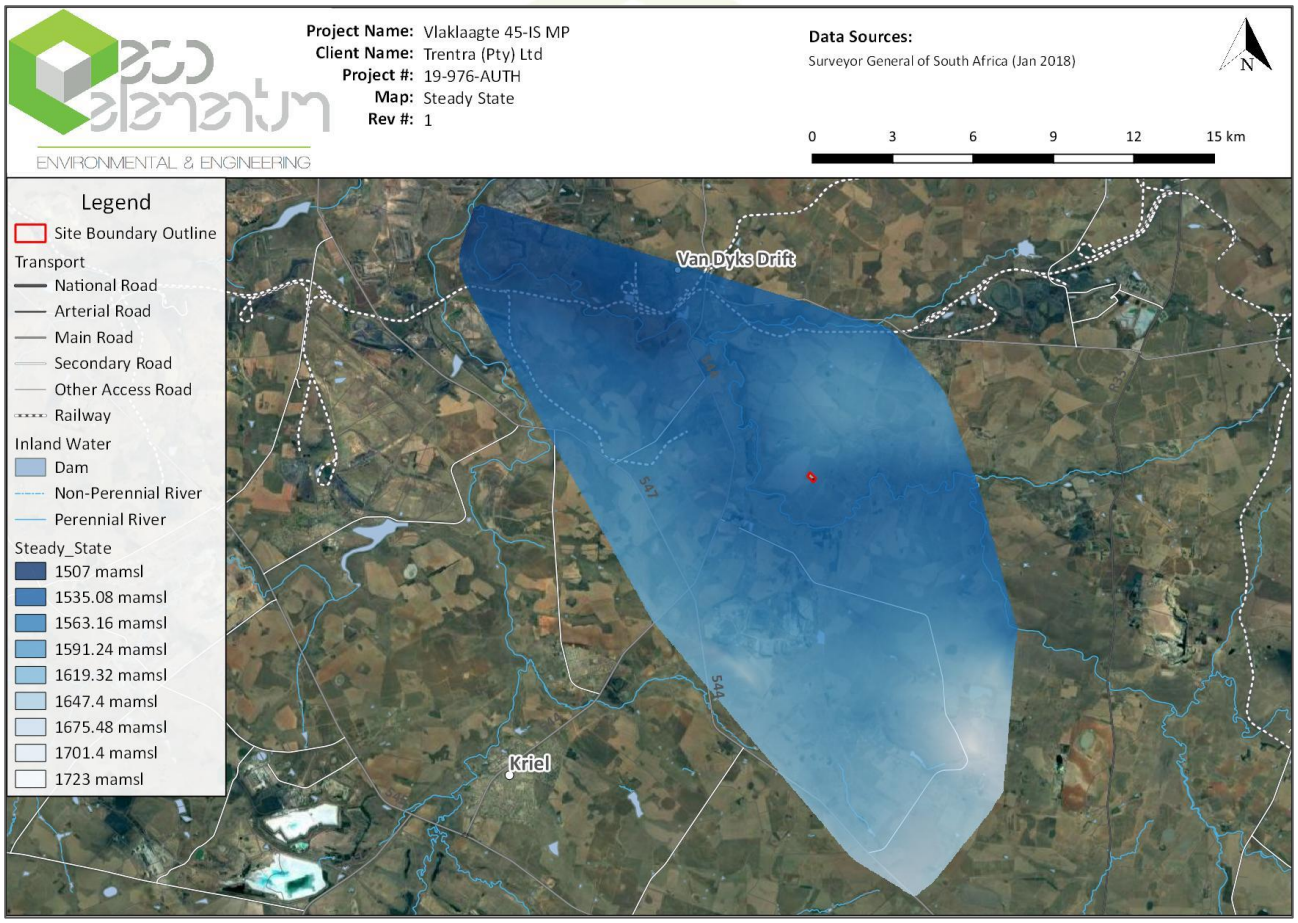

Figure 3.23). Groundwater gradients over the area is approximately 0.9%.

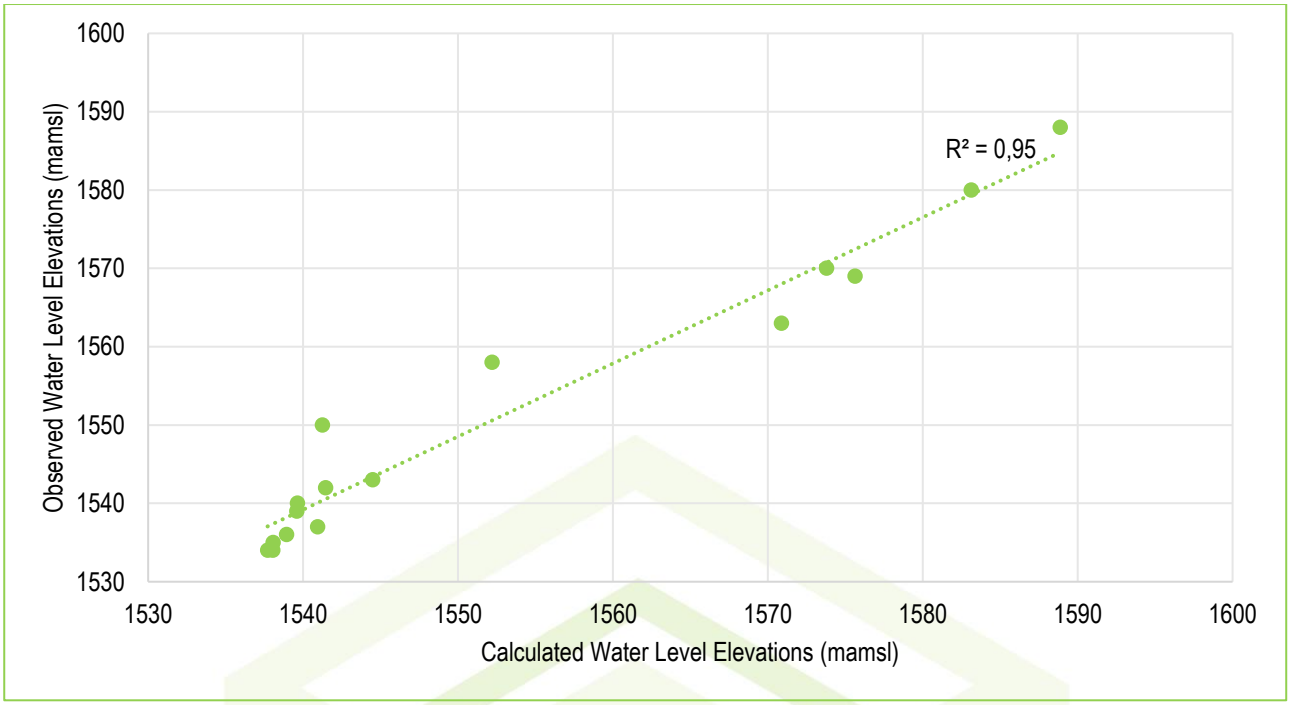

Figure 3.22: Model calculated water level elevations vs observed water level elevations correlation.

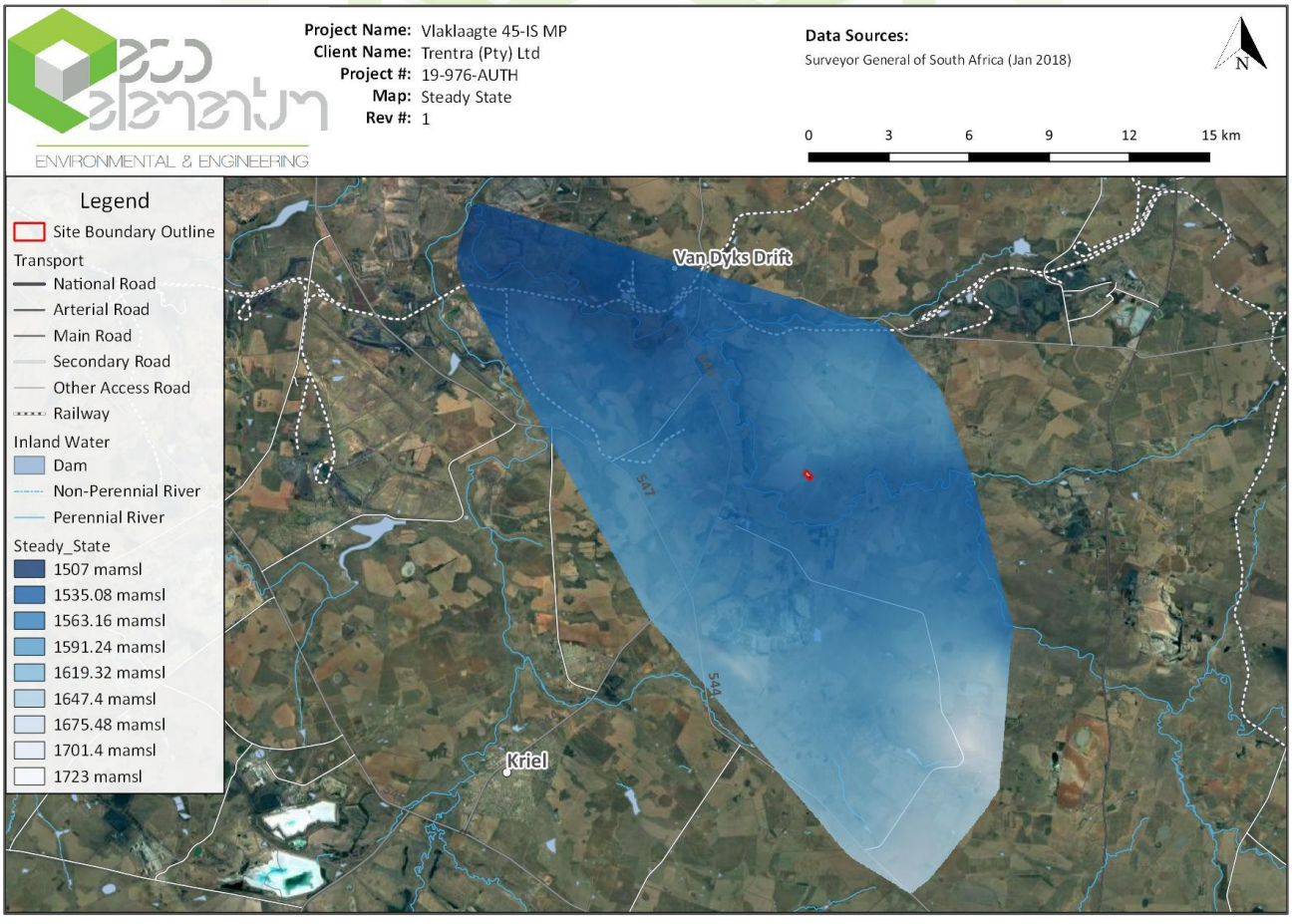

Figure 3.23: Steady state water level elevation contours.

SOILS, LAND USE AND LAND CAPABILITY

An area of 10.4 ha was assessed for the purpose of the study. This includes the 4.9 ha that is subject to the mining permit application as well as a 50m buffer area around it, following the requirement of GN320.

Soil classification

Four different soil forms are present within the study area. Approximately 5.3 ha of the study area consists of the Dresden form. The Dresden form has shallow effective soil depth (between 0.35 and 0.4m) and is underlain by hard plinthite. No significant mottling or other signs of wetness were detected in the orthic horizon above the plinthic material.

The Wasbank soil form (0.7ha of the study area) is present in a slight depression south of the Dresden form. This soil form consists of a bleached, sandy albic horizon that is limited in depth by hard plinthite. Signs of mottling were already present at soil depths of 0.25m and mottling increase with depth of the profile. The albic horizon was moist and there was an increase in wetness with soil depth.

Other soil forms within the study area are the Pinedene form (3.2ha) and the Glencoe form (1.2ha). Both these soil forms consist of orthic topsoil horizons overlying yellow-brown apedal subsoil horizons. The Pinedene form is underlain by gleyic material at around 1.3m deep while the Glencoe form is underlain by hard plinthite.

Land capability

Following the classification system of the South African Chamber of Mines, the area can be divided into two main land capability classes. The largest portion of the study area consist of land with arable land capability and is suitable for both rain-fed and irrigated crop production. This land capability class includes the Dresden, Glencoe and Pinedene forms. In drier parts of the country, the Dresden form would have been more suitable for grazing.

The second land capability class is land with wetland land capability (0.7 ha of the study area) and consist of the Wasbank form. This area is currently under cultivation of grain crops. However, it still clearly hydric indicators within the first 0.5m from the surface.

Grazing capacity

The long-term grazing capacity of the area is 5 ha/LSU. The area to be affected by the mining development could have been able to provide feed for one head of cattle. However, it seems that the area has been used for crop production already for several years.

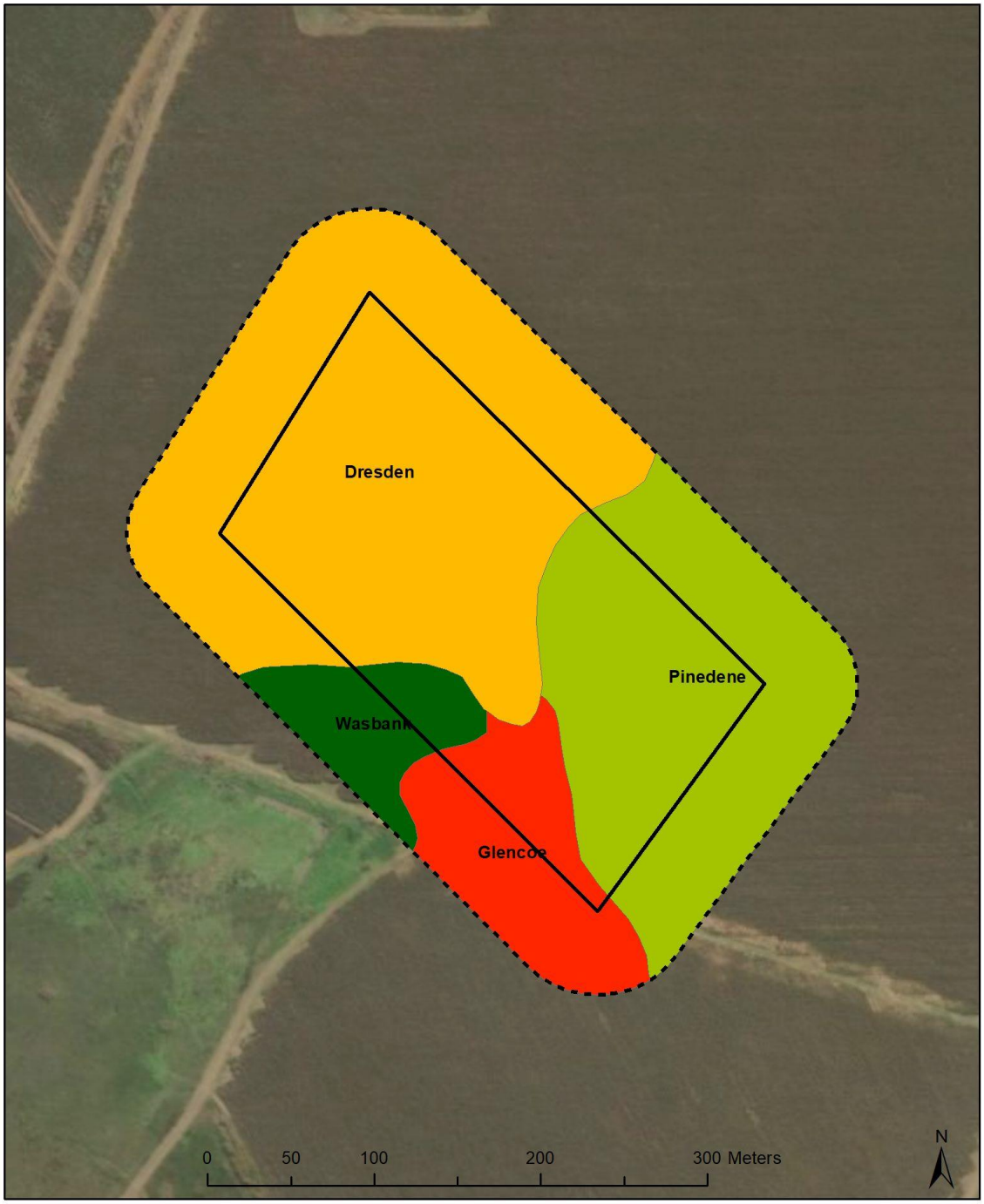

Figure 3.24: Soil Classification

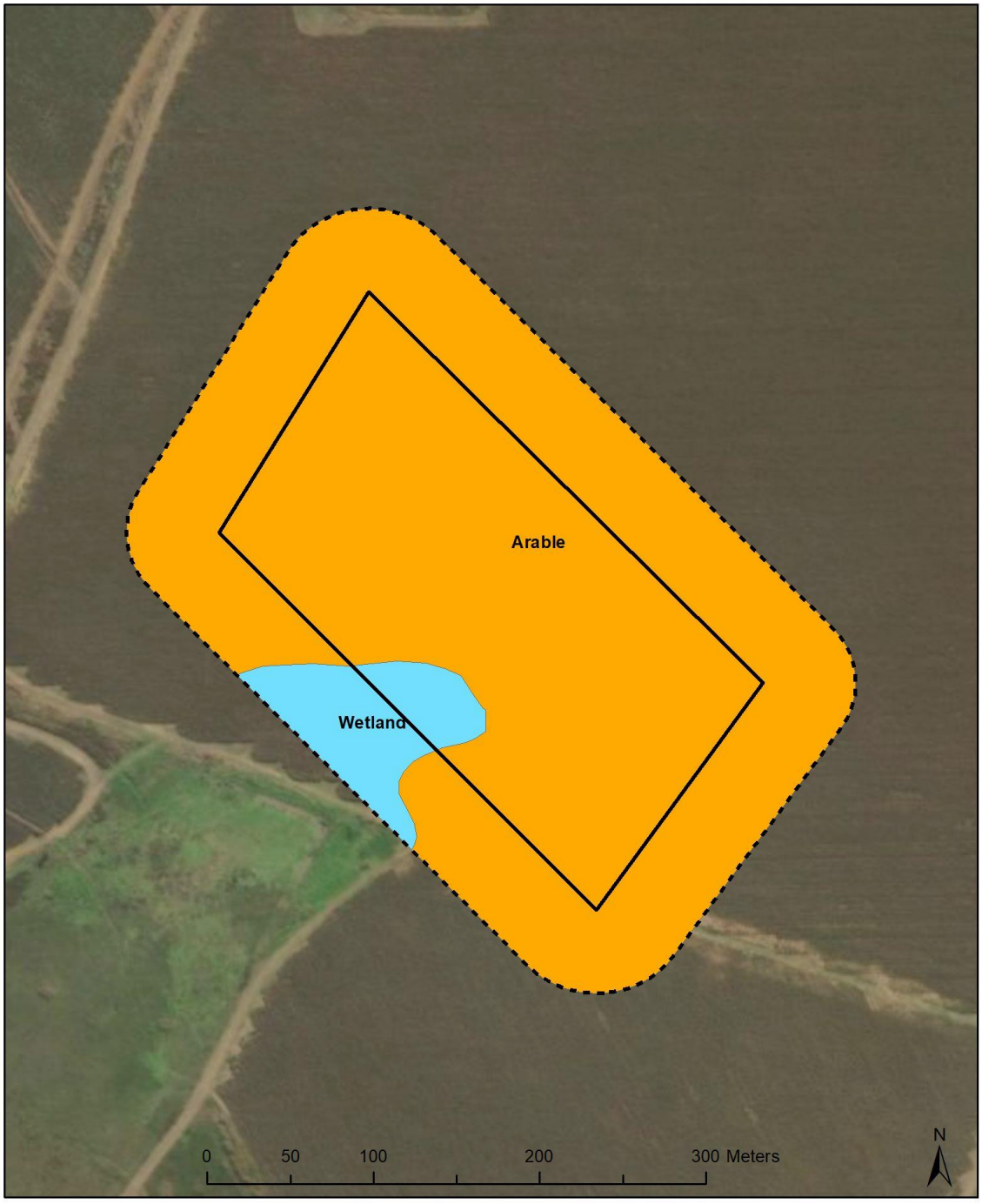

Figure 3.25: Land Capability

HERITAGE IMPACT ASSESSMENT

The study area: The proposed mining block on a Portion of the Remaining Extent of the Farm Vlaklaagte 45 IS. No sites of heritage importance were observed within the demarcated boundary on the Remaining Extent of the Farm Vlaklaagte 45 IS. Historical topographical maps verified that the area was used for crop cultivation since at least 1962 and that no structures appear to have existed at that stage. No other material of heritage importance was observed within the demarcated study area. The study area is disturbed due to the presence of maize cultivation.

NOISE ASSESSMENT

Table 3.16 depicts acceptable noise levels within districts according to the SANS 10103 guideline.

Table 3.16: Acceptable rating levels for noise in districts (SANS 10103, 2008)

Type of District	Equivalent continuous rating level ($L_{Reg.T}$) for noise (dBA)					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
	$L_{R,dna}$	$L_{Req,db}$	$L_{Req,nb}$	$L_{R,dna}$	$L_{Req,db}$	$L_{Req,nb}$
RESIDENTIAL DISTRICTS						
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
NON-RESIDENTIAL DISTRICTS						
d) Urban districts with						
some workshops, with business premises, and with main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50
NOTE 1 If the measurement or calculation time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table might result.						
NOTE 2 If the spectrum of the sound contains significant low frequency components, or when an unbalanced spectrum towards the low frequencies is suspected, special precautions should be taken and specialist advice should be obtained. In this case the indoor sound levels might significantly differ from the values given in columns 5 to 7.						
NOTE 3 In districts where outdoor $L_{R,dn}$ exceeds 55 dBA, residential buildings (e.g. dormitories, hotel accommodation and residences) should preferably be treated acoustically to obtain indoor $L_{Req,T}$ values in line with those given in table 1.						
NOTE 4 For industrial districts, the $L_{R,dn}$ concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n =70 dBA can be considered as typical and normal.						
NOTE 5 The values given in columns 2 and 5 in this table are equivalent continuous rating levels and include corrections for tonal character, impulsiveness of the noise and the time of day.						
NOTE 6 The noise from individual noise sources produced, or caused to be produced, by humans within natural quiet spaces such as national parks, wilderness areas and bird sanctuaries, should not exceed a maximum Weighted sound pressure level of 50 dBA at a distance of 15 m from each individual source.						
a) The values given in columns 2 and 5 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness of the noise and the time of day.						
b) The values given in columns 3, 4, 6 and 7 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness.						

The probable community/group response to levels in excess of the acceptable rating levels are presented in Table 3.17, where LReq,T is the equivalent continuous A-weighted sound pressure level, in decibels (dBA), determined over a specific time period. 'A-weighted' is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

Table 3.17: Categories of community/group response (SANS 10103, 2008)

Excess ($\Delta L_{Req,T}$)[a]dBA	Estimated community/group response	
	Category	Description
0 – 10	Little	Sporadic complaints
5 – 15	Medium	Widespread complaints
10 - 20	Strong	Threats of action
>15	Very strong	Vigorous action
NOTE Overlapping ranges for the excess values are given because a spread in the community reaction might be anticipated.		
a $\Delta L_{Req,T}$ should be calculated from the appropriate of the following:		
1) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS LReq,T of the residual noise (determined in the absence of the specific noise under investigation);		
2) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the maximum rating level for the ambient noise given in table 1;		
3) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the typical rating level for the applicable district as determined from table 2; or		
4) $\Delta L_{Req,T}$ = Expected increase in $L_{Req,T}$ of ambient noise in an area because of a proposed development under investigation.		

The following are noise sources in the vicinity of and the boundaries of the study area:

- Mining related noise;
- Seasonal agricultural activities;
- Traffic noise along the feeder roads;
- Distant traffic noise from the abutting feeder roads;
- Insects;
- Birds; and
- Wind noise

AIR QUALITY

The following baseline information was sourced from the ***Baseline Assessment, Problem Analysis and the Air Quality Management Plan for the Highveld Priority Area (2011).***

The Highveld area in South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occur due to the concentration of industrial and nonindustrial sources (Held et al, 1996; DEAT, 2006). The Minister of Environmental Affairs and Tourism, Martinus van Schalkwyk, therefore, declared the Highveld Priority Area (HPA) on 23 November 2007. The priority area covers 31 106 km^2, including parts of Gauteng and Mpumalanga Provinces, with a single metropolitan municipality, three district municipalities, and nine local municipalities (Figure 3.26).

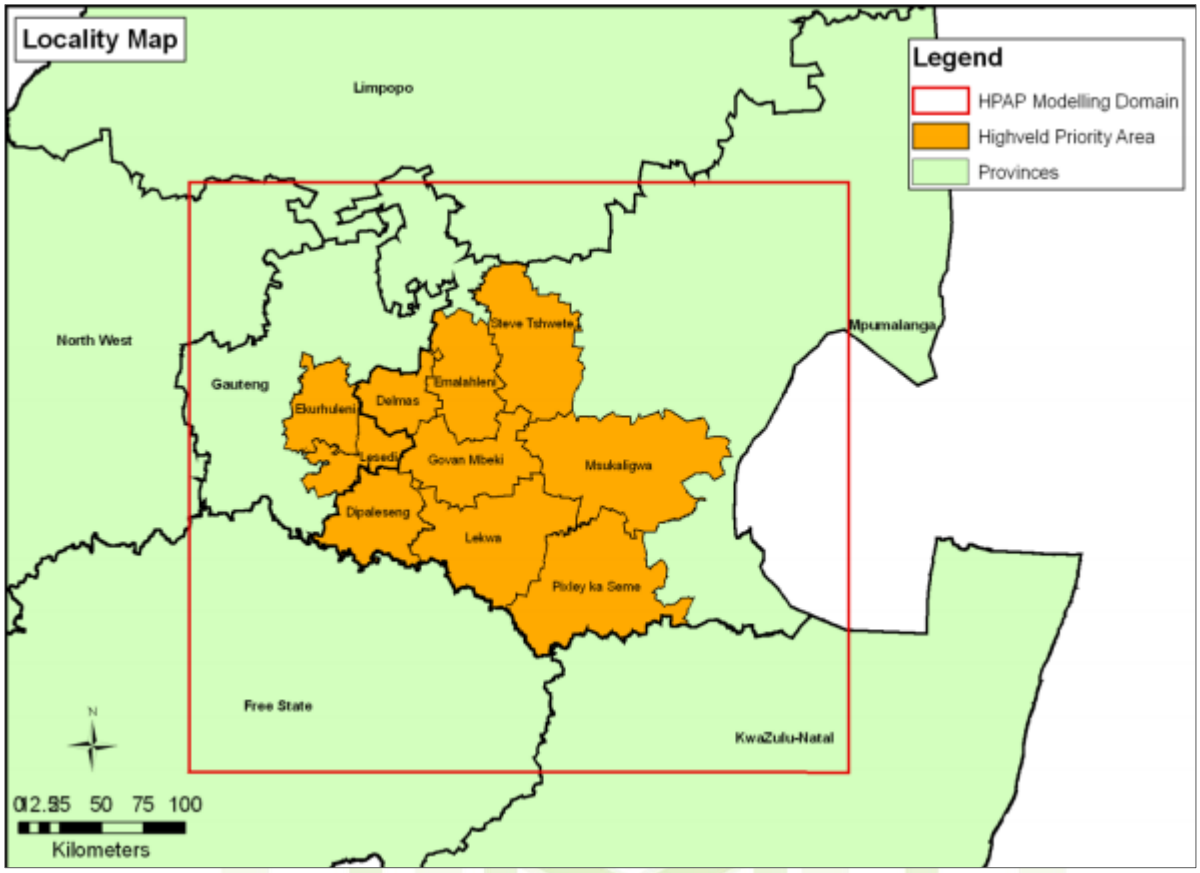

Figure 3.26: Highveld Priority Areas (HPA)

The total estimated annual emissions of fine particulate matter (PM_{10}) on the HPA is 279 630 tons, of which approximately half is attributed to particulate entrainment on opencast mine haul roads. The emission of PM_{10} from the primary metallurgical industry accounts for 17% of the total emission, with 12% of the total from power generation. By contrast, power generation contributes 73% of the total estimated oxides of nitrogen (NO_x) emission of 978 781 tons per annum and 82% of the total estimated sulphur dioxide (SO_2) emission of 1 633 655 tons per annum. The emission inventory for industrial sources was relatively complete and included all industries on the HPA with scheduled processes in terms of the APPA. Industrial sources in total are by far the largest contributor of emissions in the HPA, accounting for 89% of PM_{10}, 90% of NO_x and 99% of SO_2. Major industrial source contributors were grouped into the following categories:

- Power Generation
- Coal Mining
- Primary Metallurgical Operations
- Secondary Metallurgical Operations
- Brick Manufacturers
- Petrochemical Industry
- Ekurhuleni Industrial Sources
- Mpumalanga Industrial Sources

Table 3.18: Total emission of PM_{10}, NO_x and SO_2 from the different source types on the HPA (in tons per annum), and the percentage contribution for each source category

Source Category	PM_{10} t/a	%	NO_x t/a	%	SO_2 t/a	%
Ekurhuleni MM Industrial (incl. Kelvin)	8909	3,00	15 636	2	25 772	2
Mpumalanga Industrial	684	0,00	590	0	5 941	0

Clay Brick Manufacturing	9708	3,00	-		9 963	1
Power Generation	34373	12,00	716 719	73	1 337 521	82
Primary Metallurgical	46805	17,00	4 416	0	39 582	2
Secondary Metallurgical	3060	1,00	229	0	3 223	0
Petrochemical	8246	3,00	148 434	15	190 172	12
Mine Haul Roads	135766	49,00	-		-	-
Motor vehicles	5402	2,00	83 607	9	10 059	1
Household Fuel Burning	17239	6,00	5 600	1	11 422	1
Biomass Burning	9438	3,00	3 550	0	-	-
TOTAL HPA	**279630**	**99***	**978781**	**100**	**1633655**	**101***

* *Total Percentage does not count to 100% due to rounding of figures.*

Ambient air quality

Most of the HPA experiences relatively good air quality, but ambient air quality standards for SO_2, PM_{10} and ozone (O_3) concentrations are exceeded in nine extensive areas. These "hot spots" are illustrated in Figure 3.26 by the number of modelled exceedances of the 24-hour SO_2 and PM_{10} standards, and are confirmed by ambient monitoring data (Table 3.19). The air quality hot spots result mostly from a combination of emissions from the different industrial sectors and residential fuel burning, with motor vehicle emissions, **mining** and cross boundary transport of pollutants into the HPA adding to the base loading.

Available monitoring confirms that the areas of concern are in the vicinity of **Witbank 2**, Middelburg, Secunda, Ermelo, Standerton, Balfour, and Komati where exceedances of ambient SO_2 and PM_{10} air quality standards occur (Table 3.19).

Table 3.19: Exceedances at HPA sites based on historic and new monitoring data

Municipality	Area	NO_2 *1-hr (88)*	O_3 *8-hr (11)*	PM_{10} *24-hr (4)*	SO_2 *24-hr (4); 1-hr (88)*
Emalahleni LM	Kendal 2	1	**58**		**34; 343**
	Phola	0		3	7; 27
	Witbank	37	9	**9**	**4**; 51
	Witbank 2		**17**	**25**	1; 11
Steve Tshwete LM	Columbus				
	Komati 2			**26**	1; 14
	Hendrina	1	**22**	3	1; 2
	Middelburg	71	**60**	**7**	1; 4
	Middelburg 2		1	**7**	0; 1
Govan Mbeki LM	Sasol Club	1		0	0; 25
	Langverwacht	1		0	2; 78
	Bosjesspruit				2; 27
	Elandsfontein	0	**73**	3	4; 33
	Leandra				6; 114
	eMbalenhle	2	4	**39**	0; 1
Msukaligwa LM	Camden	0	**24**	1	0; 4
	Ermelo	1	**73**	**22**	**21**; 10
Pixley Ka Seme LM	Amersfoort				
	Majuba 1				4; 87
	Majuba 2				
	Verkykkop	0	**46**	0	1; 7

Municipality	Area	NO_2 *1-hr (88)*	O_3 *8-hr (11)*	PM_{10} *24-hr (4)*	SO_2 *24-hr (4); 1-hr (88)*
Lekwa	Standerton	4	10	**29**	1; 6
Dipaleseng	Balfour		**29**	**8**	0; 4

NB. - Row 1: The averaging period for the relevant pollutant's standard is represented below the pollutant and following the allowed frequency of exceedance in brackets - Exceedances in bold are greater than the permitted frequency in the standard for the monitoring period. The permitted frequency of exceedance varies according to period for which data is presented at each monitoring site, and for Eskom and Sasol stations must be assessed against a cumulative permitted frequency of exceedance for 3 years of data.

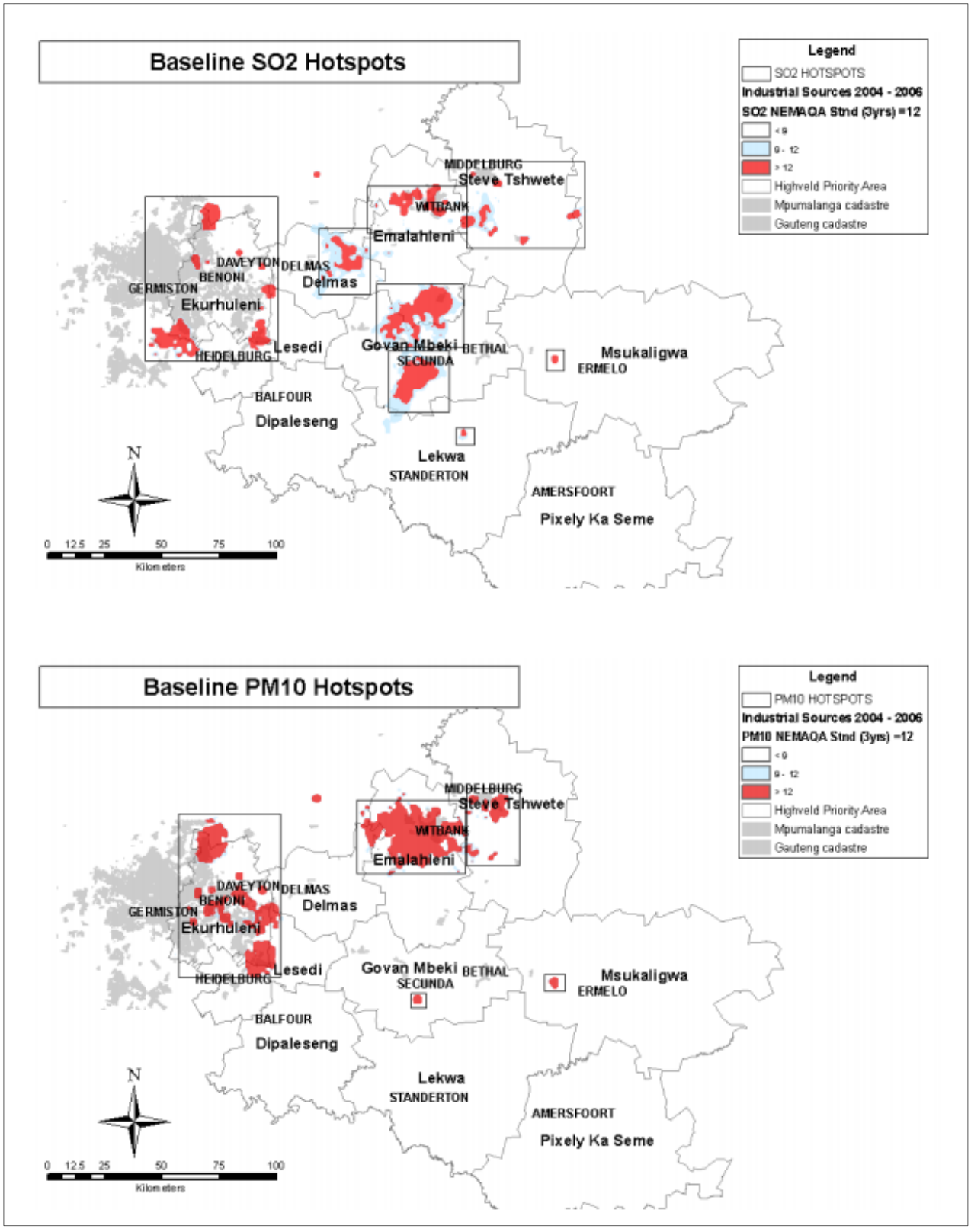

Figure 3.27: Modelled frequency of exceedance of 24-hour ambient SO_2 and PM_{10} standards in the HPA, indicating the modelled air quality Hot Spot areas

SOCIAL

The proposed Project is located in eMalahleni Local Municipality (ELM), within the Nkangala District Municipality (NDM) in Mpumalanga Province. The socio-economic characteristics of the population within each of the aforementioned areas are listed below.

Population and Demographics

According to the ELM 2013-2014 IDP, this municipality is the largest economic contributor to the NDM of the six local municipalities, contributing 45% to the districts economy. Dominant economic contributors include utilities (74.1%), mining (52.8%) and construction (52.5%). Emalahleni's population size, as recorded by Stats SA 2011, was 395 466 people which makes up 30% Nkangala District's population. The population lives in 119 874 households with an average household size of 3.3 people. This is a relatively low family size, which may reflect the young age of the urban centres in the district, in which large family structures have not had time to develop. More established towns generally have average family sizes in excess of 4.5 people, while rural areas often average 5.5 people or more per household. The ELM's population grew by 43.1% between 2001 and 2011 while annualised population growth rate was measured at 3.6%.

Educational Status

Educational achievement is a key development indicator of a population. The majority of the population (ages over twenty) in the local study area as well as district municipality have not completed matric, however, there is a large percentage of learners who complete primary level education.

Employment and Labour

According to Statistics South Africa, (2011) the employment rate for Mpumalanga Province and Nkangala District Municipality was 24% and 27% respectively (Stats SA, 2011). There has been a drop in unemployment rate in the ELM from 38.4% to 27% between 2001 and 2011. A large portion of those employed are absorbed into the mining, construction, power generation and agricultural sectors.

Annual Household Income

Over 40% of people in Mpumalanga Province have no annual income at all. Average income figures for the local study area, the ELM and the NDM are all very much in line with the provincial average; however, the income earning figures are slightly higher for the local study area, with more people earning between R3 201 and R12 800 (Stats SA, 2011). It can be gathered that the ELM has a higher income production than the provincial figures. This is attributed to the concentration of mining and power generation activities, and construction industry in this area (Stats SA, 2011).

Social Infrastructure and Services

All the urban areas within ELM (with the exception of informal settlements and townships) are fully reticulated in terms of potable water supply. A large percentage of households in the local study area have access to piped water either inside their house or within a communal yard, with an average of 77% having access to municipal water, whilst 8% have access to water through a borehole. In terms of sanitation, data from the 2011 census, show that an estimated 57% of households in the local study area have access to waterborne sewer services (flush toilets, with or without septic tanks); the majority (33%) of the remaining households use pit latrines (Stats SA, 2011). An estimated 69% of waste generated within the ELM is collected weekly by the local municipality. In contrast to the ELM, the most common means of waste disposal for populations in Ward 30 is through utilisation of their own refuse dumps (39%), 36% make use of municipal services and a significant amount of the population has no means of waste disposal at all. Of the households in local study area, 53% use electricity for cooking, heating and lighting. In contrast 69% of the households in the ELM use electricity. The bulk electricity provider throughout the municipality is Eskom (ELM IDP, 2012 - 2013). The ELM is strategically located in terms of the provincial context and transport network. It is situated in close proximity to the City of Johannesburg, City of Tshwane and Ekurhuleni Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. Although roads in the ELM are sufficiently connected with district, provincial and national roads, many secondary road systems are in a state of disrepair, being insufficient to handle the increased traffic created by mining and other industrial developments. Crime and community safety is generally a cause of concern for communities in the local study area. There has been a history of substance abuse and widespread criminal

activity in the area, with several instances of community conflict, industrial action and opposition towards the local municipality and surrounding mining companies.

Health Services

It was found in an interview with the head nurses at the Phola Community Health Centre and the Ogies Clinic that prostitution has become an increased problem within the region as a result of the mining operations; this then in turn leads to an increase in HIV/AIDS rates. The mining operations also have resulted in an influx of inhabitants into the area which has put tremendous strain on health facilities.

BLASTING

Blasting operations have effect to its surroundings. These effects can manifest in the form of ground vibration, air blast, fumes, fly rock etc. The application of explosives breaking rock will always have a positive and negative manifestation of different energies. It is the effects that have negative outcome that we concentrate on and that will need to be managed.

Ground Vibration

Explosives are used to break rock through the shock waves and gasses yielded from the explosion. Ground vibration is a natural result from blasting activities. The far field vibrations are inevitable, but un-desirable by products of blasting operations. The shock wave energy that travels beyond the zone of rock breakage is wasted and could cause damage and annoyance. The level or intensity of these far field vibration is however dependant on various factors. Some of these factors can be controlled to yield desired levels of ground vibration and still produce enough rock breakage energy.

Factors influencing ground vibration are the charge mass per delay, distance from the blast, the delay period and the geometry of the blast. These factors are controlled by planned design and proper blast preparation.

- The larger the charge mass per delay - not the total mass of the blast, the greater the vibration energy yielded. Blasts are timed to produce effective relief and rock movement for successful breakage of the rock. A certain quantity of holes will detonate within the same time frame or delay and it is the maximum total explosive mass per such delay that will have the greatest influence. All calculations are based on the maximum charge detonating on a specific delay.
- Secondly is the distance between the blast and the point of interest / concern. Ground vibrations attenuate over distance at a rate determined by the mass per delay, timing and geology. Each geological interface a shock wave encounters will reduce the vibration energy due to reflections of the shock wave. Closer to the blast will yield high levels and further from the blast will yield lower levels.
- Thirdly the geology of the blast medium and surroundings has influences as well. High density materials have high shock wave transferability where low density materials have low transferability of the shock waves. Solid rock i.e. norite will yield higher levels of ground vibration than sand for the same distance and charge mass. The precise geology in the path of a shock wave cannot be observed easily, but can be tested for if necessary in typical signature trace studies - which are discussed shortly below.

Normally, in order to determine effective control measures, it will be required to do signature hole trace study. This process consists of charging and blasting test holes that are measured for ground vibration and air blast at various distances. Signature trace data can then be used to determine site specific constants for prediction of ground vibration and assist in determining timing of blasts in order to minimize the effect of vibration.

Air blast

Air blast or air-overpressure is pressure acting and should not be confused with sound that is within audible range (detected by the human ear). Sound is also a build up from pressure but is at a completely different frequency to air blast. Air blast is normally associated with frequency levels less than 20 Hz, which is the threshold for hearing. Air blast is the direct result from the blast process although influenced by meteorological conditions the final blast layout, timing, stemming, accessories used, covered or not covered etc. all has an influence on the outcome of the result.

The three main causes of air blasts can be observed as:

- Direct rock displacement at the blast; the air pressure pulse (APP)

- Vibrating ground some distance away from the blast; rock pressure pulse (RPP)
- Venting of blast holes or blowouts; the gas release pulse (GRP)

Fly Rock

Blasting practices require some movement of rock to facilitate the excavation process. The extent of movement is dependent on the scale and type of operation. For example, blasting activities within large coal mines are designed to cast the blasted material much greater distances than practices in a quarrying or hard rock operation. This movement should be in the direction of the free face, and therefore the orientation of the blasting is important. Material or elements travelling outside of this expected range may be considered to be fly rock.

Fly rock from blasting can result from three mechanisms due to the lack of confinement of the energy in the explosive column. The main mechanisms are:

- Face burst - burden conditions usually control fly rock distances in front of the face
- Cratering - If the stemming height to hole diameter ratio is too small or the collar rock is weak
- Rifling - If the stemming material is ejected with insufficient stemming height or inappropriate stemming material is used

In short the following list is typical causes of fly rock:

- Burden to small,
- Burden to large,
- Stemming length to short,
- Out of sequence initiation of blast holes,
- Drilling inaccuracies,
- Incorrect blast hole angles,
- Over charged blast holes.

It is possible to blast without any fly rock with proper confinement of the explosive charges within blast holes using proper stemming procedures and materials. Stemming is further required to ensure that explosive energy is efficiently used to its maximum. Free blasting with no control on stemming cannot be allowed as this will result in poor blast results and possible damage to any nearby structures.

Noxious Fumes

Explosives currently used are required to be oxygen balanced. Oxygen balance refers to the stoichiometry of the chemical reaction and the nature of gases produced from the detonation of the explosives. The creation of poisonous fumes such as nitrous oxides and carbon monoxide are particular undesirable. These fumes present themselves as red brown cloud after the blast detonated. It has been reported that 10 to 20 ppm has been mildly irritating. Exposure to 150 ppm or more (no time period given) has been reported to cause death from pulmonary edema. It has been predicted that 50% lethality would occur following exposure to 174 ppm for 1 hour. Anybody exposed must be taken to hospital for proper treatment.

Factors contributing to undesirable fumes are typically: poor quality control on explosive manufacture, damage to explosive, lack of confinement, insufficient charge diameter, excessive sleep time, and specific types of ground can also contribute to fumes.

Poor quality control on explosives will yield improper balance of the explosive product. This is typically in the form of too little or too much fuel oil or incorrect quantities of additives to the mixture. Improper quality will cause break down on the explosives product that may result in poor performance. A “burning” may occur that increases the probability of fumes in the form of NO and NO_2.

Damage to explosives occur when deep blast hole is charged from the top of the hole and literally fall into the hole and get damage at the bottom. The bottom is normally the point of initiation and damaged explosives will not initiate properly. A slow reaction to detonation is forced and again contributes negatively to the explosives performance and fume creating capability.

Studies showed that inadvertent emulsion admixture with drill cuttings can also be a significant contributing factor to NOx production. The NO production from the detonation of emulsion equally mixed (by mass) with drill cuttings increased by a factor of 2.7 over that of emulsion alone. The corresponding NO_2 production increased by a factor of 9 while propagating at a steady Velocity of Detonation.

Water also has visible effect on the generation of fumes from emulsion explosives. Tests have shown that the detonation velocity may not be influenced as much but the volumes of fumes generated were significantly higher.

Further is also known that for certain ground types, especially the oxidized type materials could have an advert effect on explosives as well. These ground materials types tend to react with the explosives and causes more than expected fumes.

Drill diameter is also contributing factor to explosive performance and the subsequent generation of fumes. Explosives are diameter dependant for optimal performance. If diameter is too small for a specific product improper detonation will occur and may result in a burning of the product rather than detonation. This will have an adverse effect of more fumes created. Each explosive product has a critical diameter. It is the smallest diameter where failure to detonate properly occurs. ANFO blends are normally not good for small diameter blast holes and emulsion explosives can be sued in the smaller diameter blast holes.

3.h.iv.1.b Description of the current land uses.

The current land use is dominated by crop farming with coal mining developments in all directions around the site. The mining developments are interspersed by crop fields and patches of grazing land used for livestock farming as this was the main land use prior to the steep growth in mining developments in the area.

3.h.iv.1.c Description of specific environmental features and infrastructure on the site.

The majority of the study site consisted of alien invasive vegetation and very little indigenous vegetation. The natural ecology was heavily modified on site, with a Seep Wetlands draining towards the Olifants River to the South. No Built structures were present on site

3.h.iv.1.d Environmental and current land use map.

(Show all environmental and current land use features)

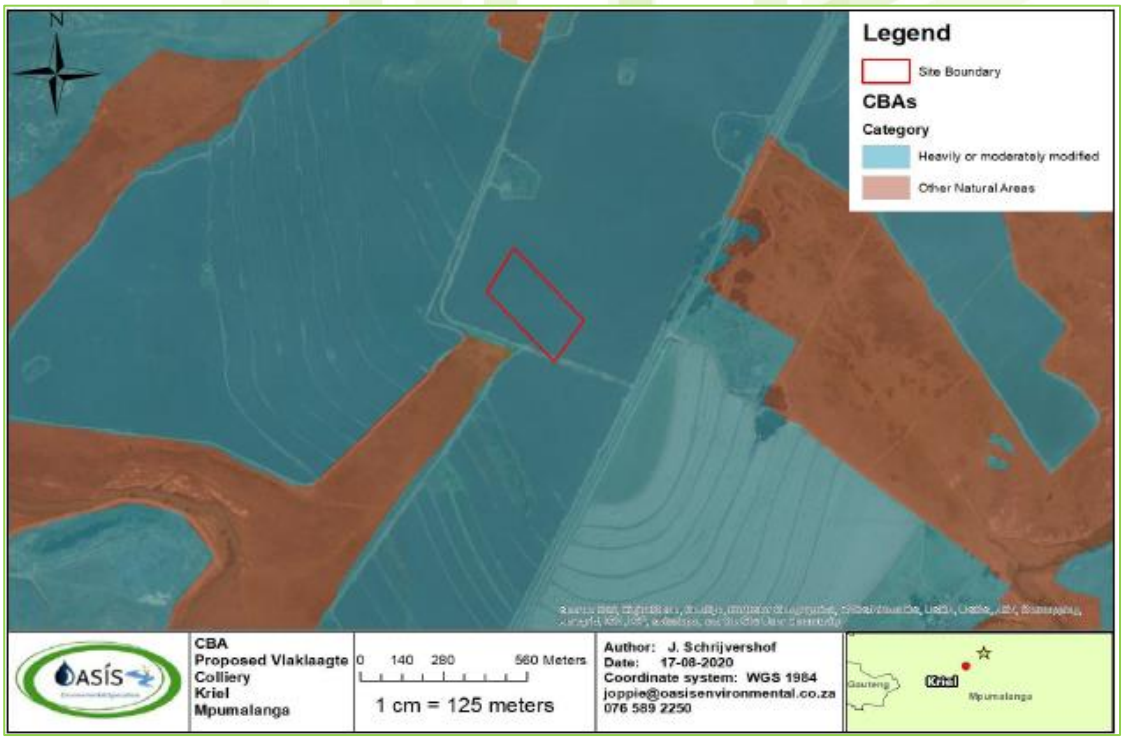

Figure 3.28: Critical Biodiversity Areas map.

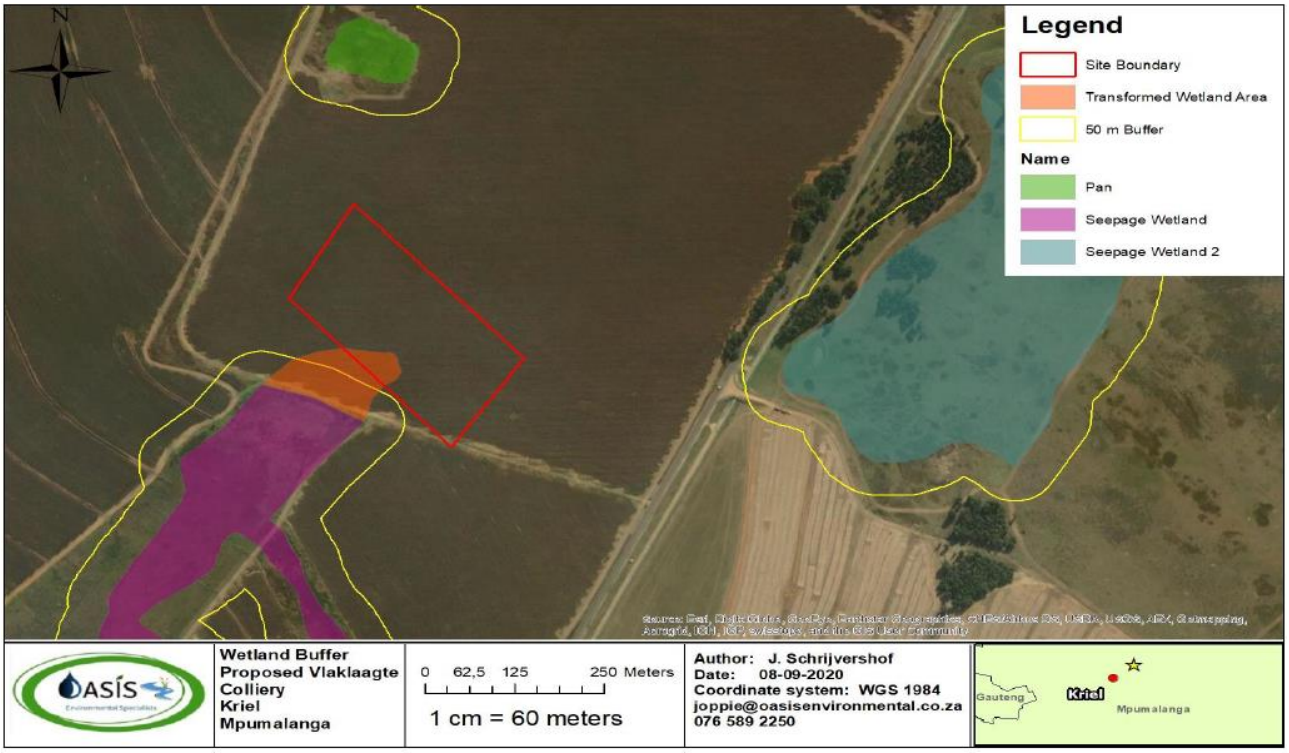

Figure 3.29: Delineated Wetlands with 50m buffer

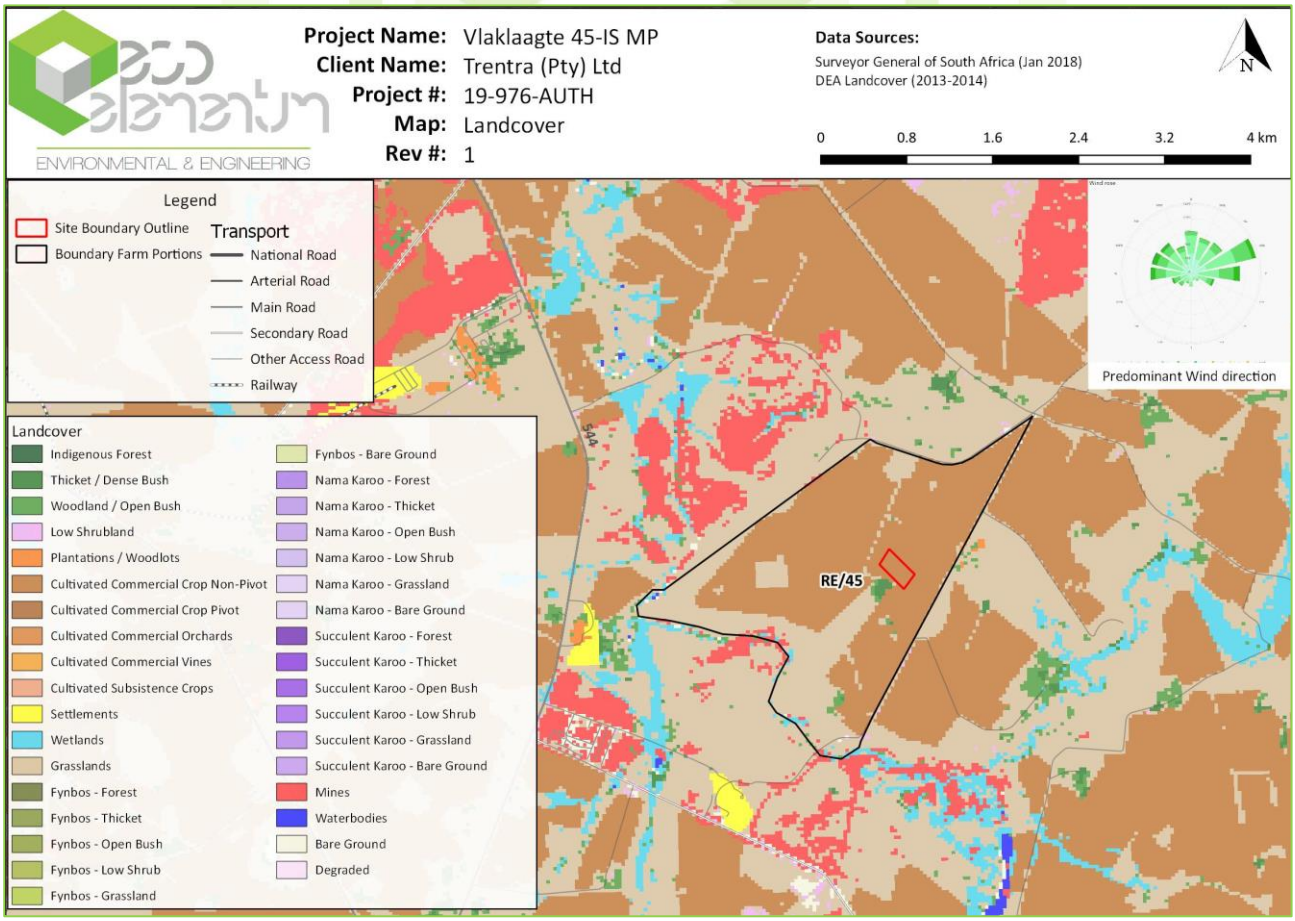

Figure 3.30: Land cover of the study area

3.h.v Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impact.

WETLANDS AND AQUATICS

Sedimentation and soil erosion

Soil erosion will result in the deposition of sediment into the wetland system; posing a risk to the downstream catchment geomorphological/functional integrity. Subsequent impacts that are likely to result are: a loss of instream flow including aquatic refugia and flow dependent taxa; sedimentation of the watercourse that will be destructive to many faunal species affecting their habitat; breeding and feeding cycles.

Some of the key biological effects related to the deposition of sediment and suspension of fine sediment within the watercourses includes:

- Habitat alteration downstream of crossing points due to increased sediment deposition (degradation of coarse riverbed habitats by the infilling of interstitial spaces and the reduction of inter-granular flow for example);
- Reductions in photosynthetic activity and primary production caused by sediments impeding light penetration;
- Reduced density and diversity in benthic invertebrate communities as a result of habitat degradation, blanketing of fish spawning sites and the establishment of more tolerant taxa or exotic species; and
- Changes to the behaviour and feeding ability of fish at low levels of suspended sediments, while physiological damage and mortality can occur at very high concentrations of suspended sediment resulting in clogging of fish gills, interference in embryogenesis and larval development of amphibians and mortality of filter-feeding macro-invertebrates.

During the operational phase of the plants rainfall is likely to filter through into the waste dump. This water is likely to accumulate particles and pollutants that will pose a risk to the surrounding water courses. Sediment that washes off the waste dump during periods of rainfall will also contribute to increased sedimentation in the aquatic environment.

Erosion and sedimentation impacts are linked to alterations in hydrological regimes as a result of increased storm water flood peaks associated with increased impermeable surfaces and the concentration of flows. Increases in peak discharge may significantly increase stream power, increasing the risk of erosion (localised scouring and incision) and resultant sedimentation of watercourses. Local site factors such as soil erodibility, vegetation cover, gradient of local slopes and regional rainfall/runoff intensity will affect the probability and intensity of erosion impacts (Macfarlane et al., 2014). Typical results of erosion & sedimentation on water resources may include:

- Locally increased channel slopes;
- Loss of in-stream biotope diversity due to scouring or blanketing of sites with sediment;
- Localised scouring at stormwater discharge points into watercourses;
- Head cut migration upstream and subsequent deepening of channels (where base level lowering has occurred);
- Lowering of the local water table and subsequent desiccation of adjacent to the river and riparian areas;
- Relatively higher channel banks that may exceed critical height resulting in bank failure/collapse;
- Addition of sediment to the water column (increased turbidity) affecting suitability for aquatic organisms; and
- Deposition of large masses of sediment downstream causing localised channel braiding, instability of the river banks and alterations in water distribution.

Pollution of water resources and soil

Changes to the water quality will result in changes to the ecosystem structure and function as well as a potential loss of biodiversity. Water quality pollution leads to modification of the species composition where sensitive species are lost and organisms tolerant to environmental changes dominate the community structure. Any substances entering and polluting watercourses will directly impact downstream ecology through surface runoff during rainfall events, or subsurface water movement, particularly during the wetter summer months.

Contaminants such as hydrocarbons, solids, pathogens and hazardous materials may enter watercourses (examples include petrol/diesel, oil/grease, paint, cement/concrete and other hazardous substances). These contaminants negatively affect aquatic ecosystems including sensitive or intolerant species of flora and fauna. Where significant changes in water quality occur, this will ultimately result in a shift in aquatic species composition, favouring more tolerant species, and potentially resulting in the localised

exclusion of sensitive species. Water quality monitoring must be implemented to ensure sustainable management of water sources within that area. Sudden drastic changes in water quality can also have chronic effects on aquatic biota leading to localised extinctions. Deterioration in water quality will also affect its suitability for human domestic/agricultural use and have far reaching impacts for local communities who may rely on rivers as water supply (Macfarlane et al., 2014).

Alien Invasive Species

There are minimal alien invasive plant species currently present within the area. Any ground disturbance provides an opportunity for alien invasive plant species to spread and for new species to establish themselves in the areas. Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and "quality" of species), change nutrient cycling and productivity, and modify food webs (Zedler & Kercher, 2004). Such changes on the ecology of the riparian habitat have/will have a detrimental impact on its ability to maintain both floral and faunal biodiversity. Invasive alien plant species, particularly woody species, have much increased water usage compared with indigenous vegetation. Many alien invasive plant species are particularly found in riparian ecosystems and their invasion results in the destruction of indigenous species; increased inflammable biomass (high fire intensity); erosion; clogging of waterways such as small streams and drainage channels causing decreased river flows and incision of river beds and banks. This results in an overall impact on the hydrological functioning of the system.

Physical alteration of cross-sectional and longitudinal profiles of rivers may also result from bulk earthworks associated with the plants for example, altering natural water flow and sediment dynamics within rivers, having a knock-on effect on habitat and ecosystem dynamics. These impacts can stimulate erosion, as well as potential sedimentation of downstream habitats and a change to water regimes of adjoining riverine and riparian habitat. Areas that are mainly natural/intact would be most affected by these impacts (Macfarlane et al., 2014).

HYDROGEOLOGY

Impacts anticipated on the groundwater are as follows:

- Groundwater Drawdown due to dewatering of the pit
- Removal of the natural geological layers and disturbance of groundwater.
- Water quality deterioration due to Acid Rock Drainage from the open pit workings, and hydrocarbon spills on site.
- Decant of acidic / poor quality water after mine closure due to groundwater rebound.

Drawdown

The simulated drawdown cone as a result of the opencast mining area are presented in **Figure 3.**31. The maximum extent of the drawdown cone is not expected to exceed 60 m from the pit area. The maximum simulated drawdown was 18m, but as mentioned previously this value can change once more site-specific details becomes available. Private users within the cone of depression extent area may be influenced in terms of water level drawdown. No surface water features are expected to be impacted on in terms of base-flow decrease.

Table 3.20: Simulated maximum drawdown in the pit and drawdown cone extent from the pit boundaries.

Opencast Pit	Maximum simulated drawdown (m)	Maximum drawdown cone extent from pit boundary (m)
Tentra Vlaklaagte pit	18	60

Figure 3.31: Simulated drawdown in the Trentra Vlaklaagte mining pit.

Mass Transport during Facility

During the operational phase and for a period after, until the water level has reached equilibrium, a contamination plume will not migrate away from the mining operation. This is due to the fact that the opencast pits act as a groundwater sink. Contaminated groundwater, as a result of acid mine drainage will be contained within the pit areas. Where progressive backfilling has occurred at lower elevations, the water level may start to recover and cause a down gradient movement of a contamination plume. The mass transport simulations at the end of the proposed mining operations for Trentra Vlaklaagte are presented in **Figure 3.**32.

Figure 3.32: The simulated mass transport at the end of the operational phase at the Trentra Vlaklaagte mining area.

The simulated groundwater contamination plumes at 50 years post-facility (**Figure 3.**33**)** indicates that the plume will start to migrate down gradient from the pit area. The sulphate concentrations in the pit areas increases as a result of acid generation **(**Error! Reference s ource not found.**)**. Overall the plume from the mine workings migrates towards the south-east with the groundwater flow directions. The contamination plume from the pits in **Figure 3.**33 is not expected to extent more than 230 m over the period of 50 years post-mining.

Table 3.21: 50 years post-closure results of the potential sulphate pollution plume from the proposed pit at Trentra Vlaklaagte.

Opencast Pit	Maximum simulated Sulphate Concentration in pit (mg/l)	Maximum simulated plume extent from pit boundary (m)	Potential plume migration direction from the pit
Pit A	± 2 500	± 230	South-east

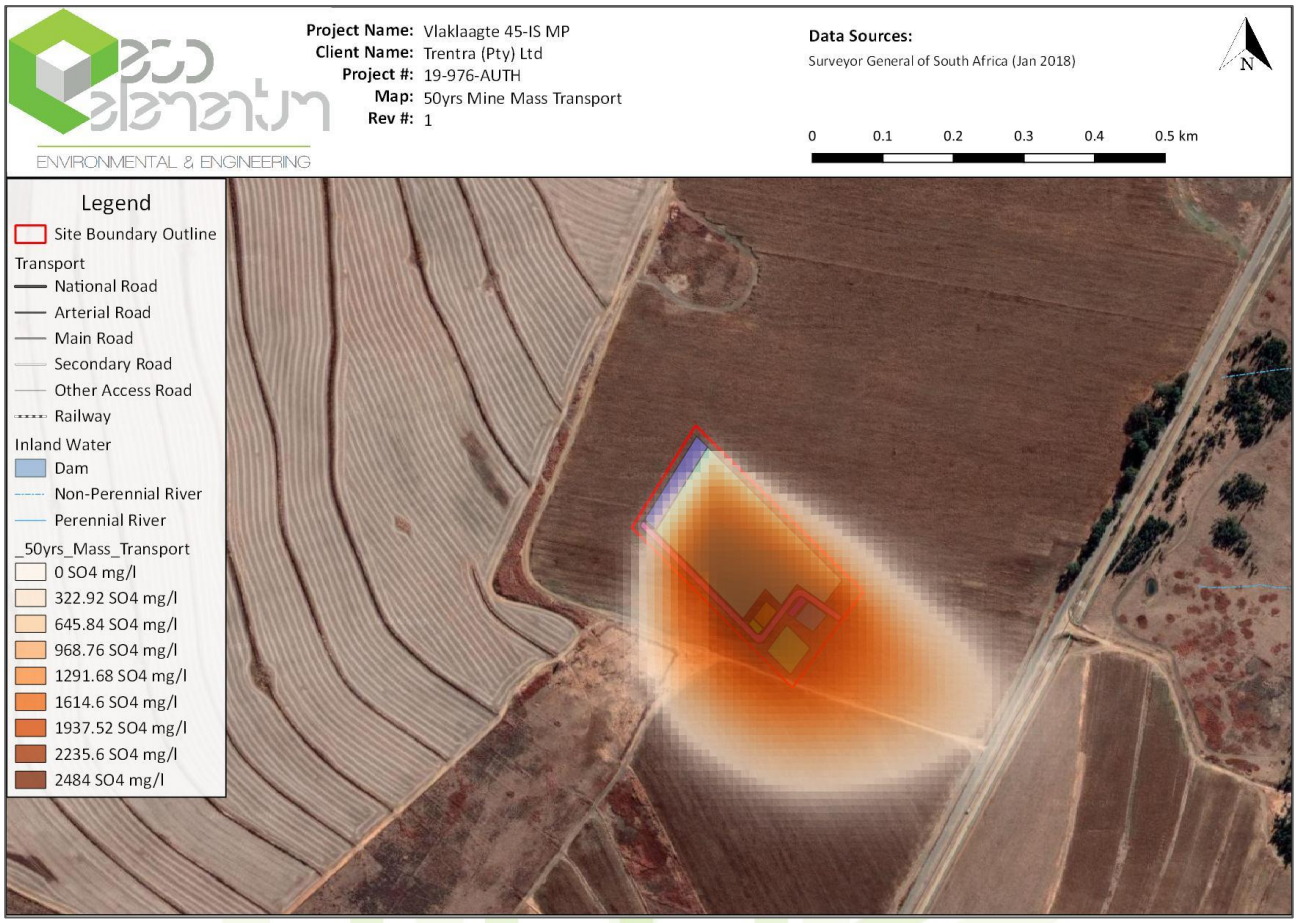

Figure 3.33: Model Simulated groundwater contamination plume 50 years post facility at Trentra Vlaklaagte.

Private users within the cone of depression extent area may be influenced in terms of quality decreases. No surface water features are expected to be impacted on in terms of poor-quality discharge to the features.

Estimated filling time of the opencast pit to decant elevation is presented in **Table 3.**22. The entire pit floor is below the potential decant point. The positions of the potential decant point is indicated in **Figure 3.**34. The estimations indicate that the time to decant is 120 years. Available information indicates that the pit depth will be as deep as 40m. The decant estimations should be updated once site-specific information becomes available.

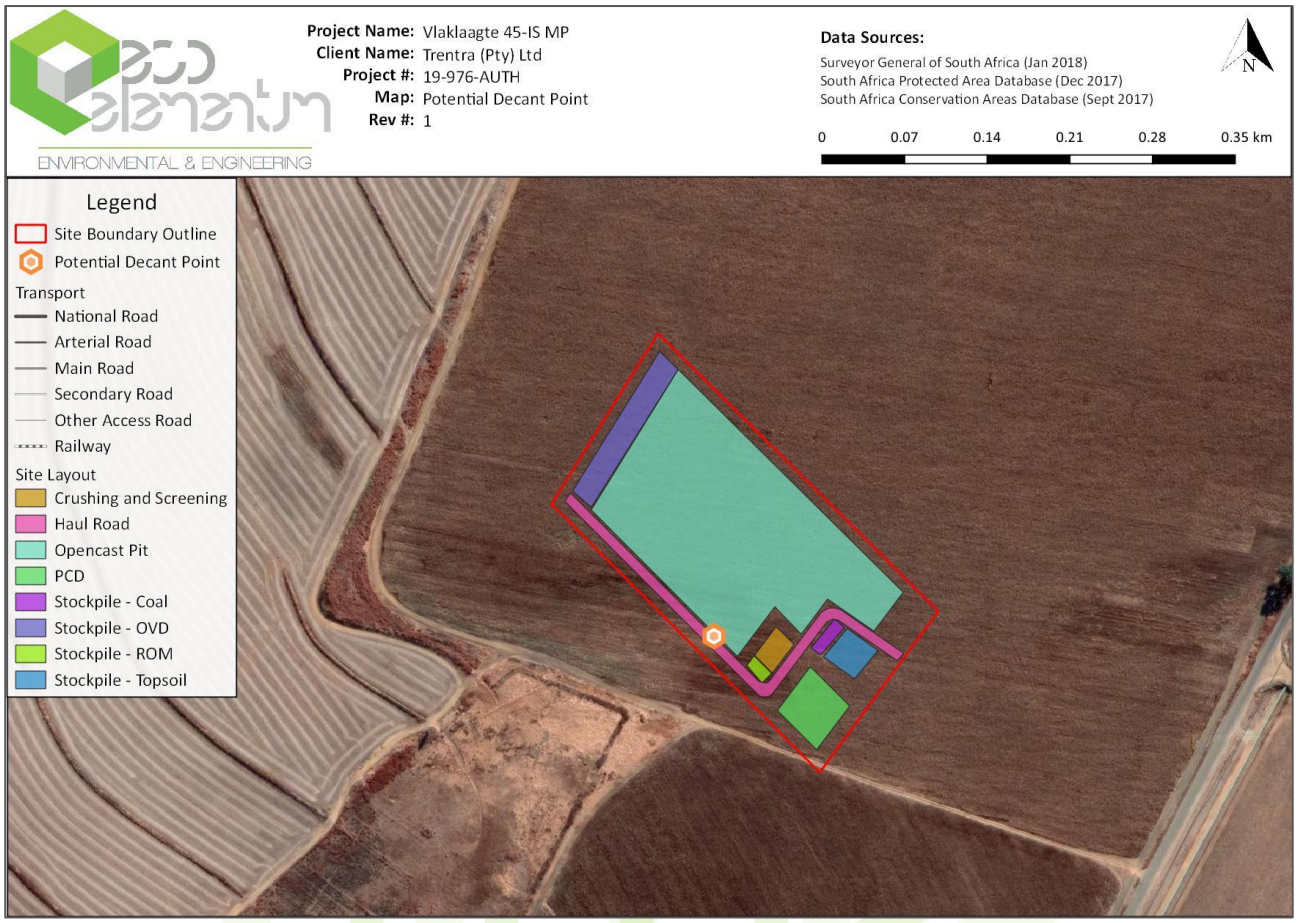

Figure 3.34: The potential decant point position.

Table 3.22: Estimated time to decant and fill time of the Trentra Vlaklaagte pit.

	Trentra Vlaklaagte
Annual Rainfall (m/a)	0,665
Decant Elevation (mamsl)	1576
Mined Area (m2)	27735
Mined Volume Below Decant Elevation (m3)	1109400
Annual Recharge to Rehab Pit area (m3/y):	
10%	1844
12,50%	2305
15%	2767
Voids (m3):	
20% porosity	221880
25% porosity	277350
30% porosity	332820
Average Time to Decant (years)	**120**
Average expected decant rate (m^3/d)	**6**

SOILS, LAND USE AND LAND CAPABILITY

Soil compaction

Soil compaction will take place due to unnatural load and increased traffic by construction vehicles in the area that will change soil structure. Soil compaction generally reduces the amount of water that plants can take up. This is because compaction crushes many of

the macropores and large micropores into smaller pores, and the bulk density increases. As the soil particles are forced closer together, soil strength increases and limits root penetration. Compaction also results in aggravation of run-off erosion as compaction reduces the water infiltration rate.

Soil compaction will be an impact during all the entire construction phase, operational phase and decommissioning phase. While it may still be present at the closure phase, mitigation and management measures should aim to alleviate the compaction before roll-over rehabilitation commences.

The effect of this will largely be within the site boundary and is highly likely to occur frequently due to the constant movement of vehicles as well as the weight of the topsoil berm overlying the in situ soil profiles underneath.

The main mitigation measure for minimising the negative impact of compaction is to limit the areas affected by construction activities. Limiting heavy vehicle access to haul roads and construction areas only is especially important. Deep ripping is recommended to alleviate compaction before revegetation, especially if there is an attempt to restore the agricultural potential of the land.

Destruction of soil nutrient cycles

Earthworks will include clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling in order to access the coal resource. The removal of vegetation from the surface and the stripping of topsoil in areas where necessary, negatively affects the nutrient cycles of topsoil horizon and results in loss of soil fertility. Disruption of soil nutrient cycles are considered reversible when the activities causing the impact is short-term (less than six months).

Soil chemical pollution

The use of vehicles that can result in oil and fuel spills on site as well as waste generation by mine workers can result in possible chemical soil pollution. In addition to this, dust suppression can result in soil pollution, especially when the water used contains additives to aid the dust suppression or the water used is of marginal quality.

Soil erosion

Soil erosion is anticipated as a result of vegetation clearance that will leave the soil surface exposed. Topsoil stockpiles are also susceptible to erosion, especially when not covered by any vegetation. Soil erosion results in the loss of the nutrient-rich upper layers of the soil. Soil erosion can only be prevented for once it has occurred, it is a permanent impact as soil particles transported away from the landscape by wind and water energy, cannot be recovered. Although there are off-site indirect impacts associated with soil erosion, the impact is mainly considered to be local.

Loss of land capability

Once vegetation clearance and stripping of topsoil commences, the in situ soil profiles are disturbed and the inherent soil fertility associated with the original horizon organisation is lost. While several research and rehabilitation projects have aimed to re-establish the arable potential of the land, it has not been proven yet that the rainfed agricultural potential of the land can be restored. Roll-over rehabilitation should still aim though to get the land as productive as possible.

HERITAGE IMPACT ASSESSMENT

No impacts anticipated.

NOISE ASSESSMENT

The potential environmental noise impact will be moderate and after the implementation of noise mitigatory measures it will change to low. The impact will be low during the decommissioning phase. The impact will be moderate during the operational phase. The following mining related activities will create a noise increase in the immediate vicinity of the mining activities on a permanent basis:

- Pit activities;

Figure 3.35: Predicted average annual concentrations for PM10 for the proposed Vlaklaagte project when unmitigated.

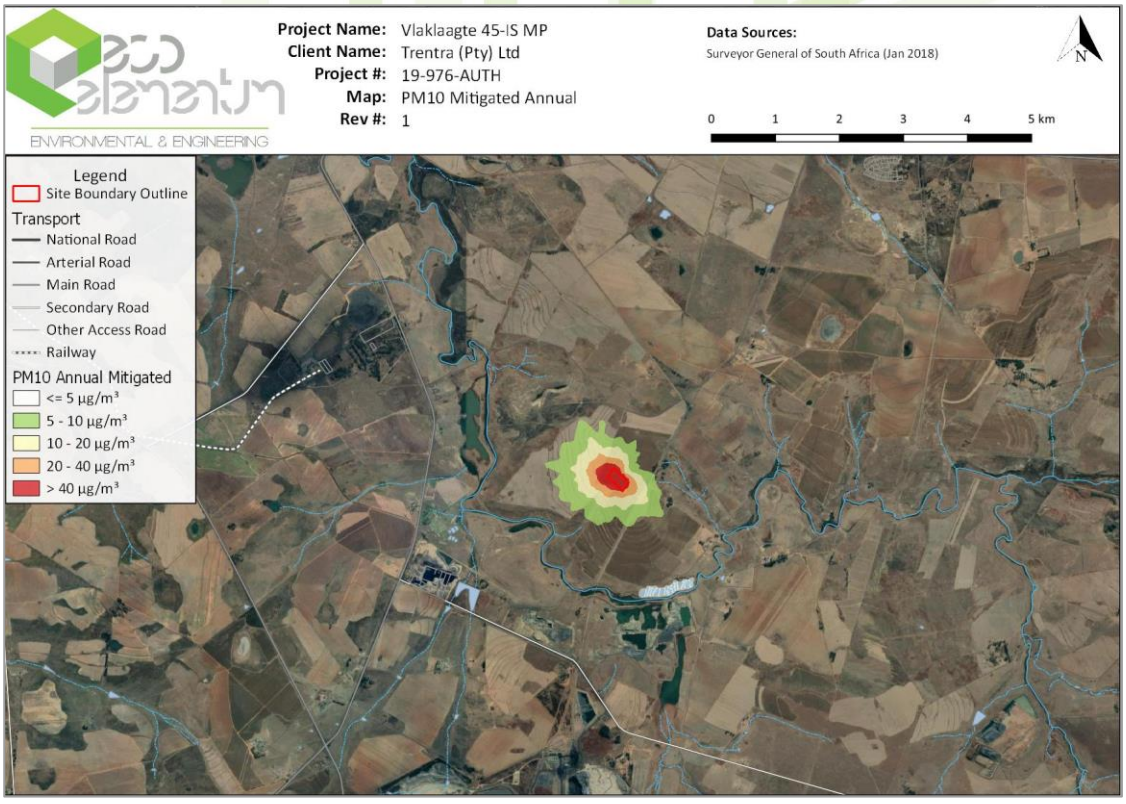

Figure 3.36: Predicted average annual concentrations for PM10 for the proposed Vlaklaagte project operations when mitigated.

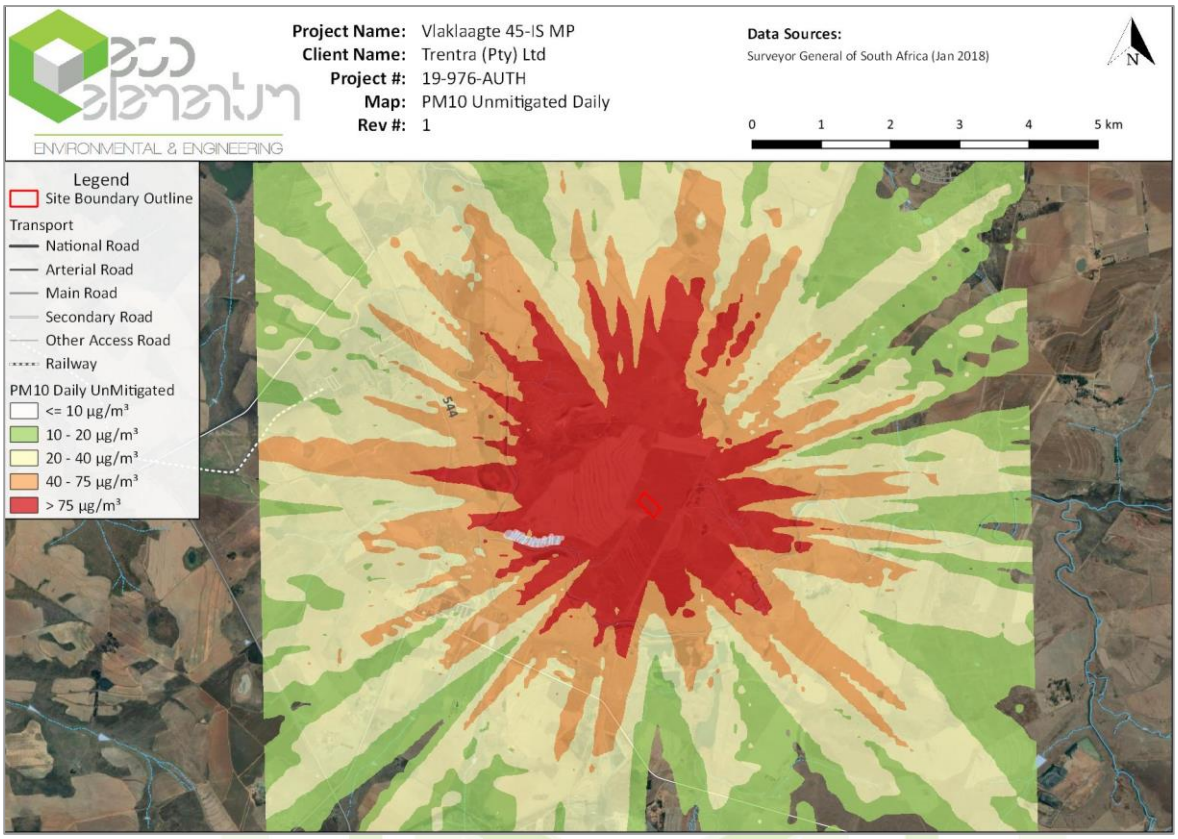

Figure 3.37: Predicted 2nd Highest daily concentrations for PM10 for the proposed project operations when unmitigated.

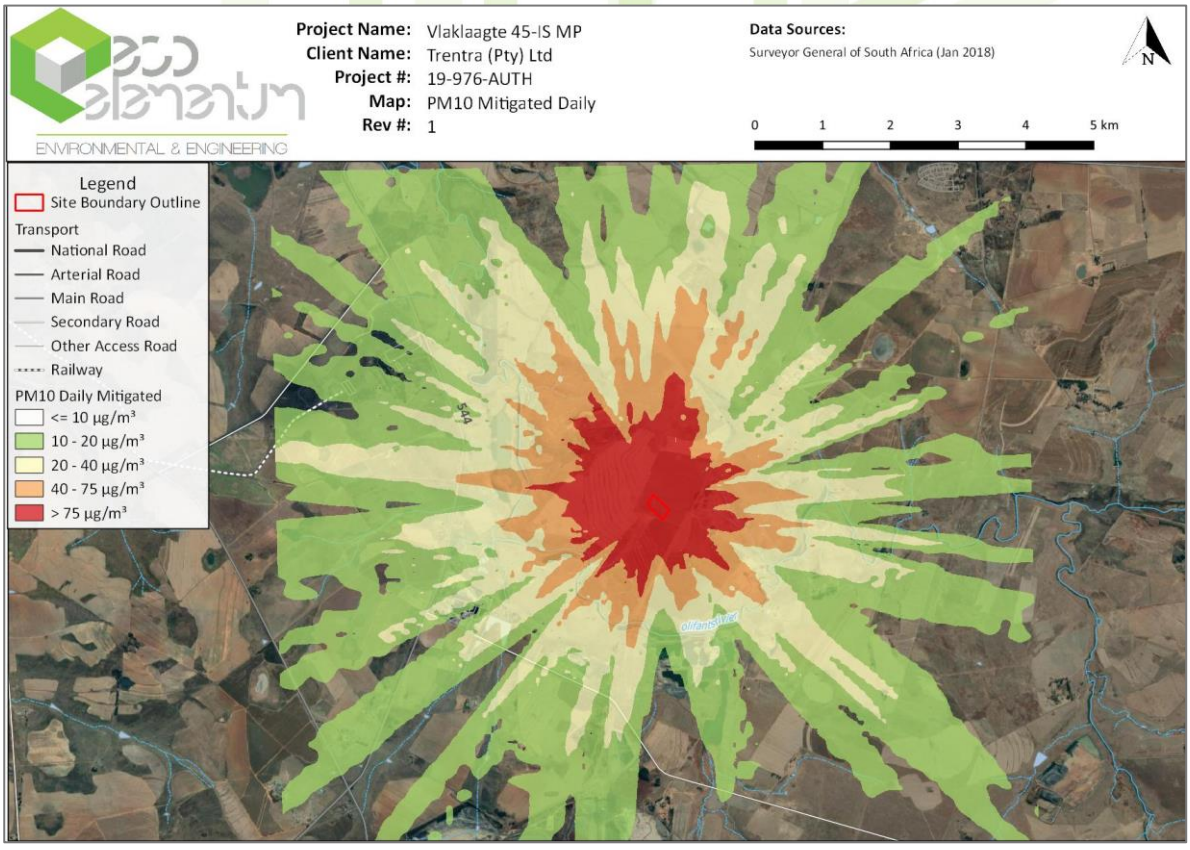

Figure 3.38: Predicted 2nd Highest daily concentrations for PM10 for the proposedVlaklaagte project operations when mitigated.

Figure 3.39: Predicted average annual deposition for TSP for the proposed Vlaklaagte project operations when unmitigated.

Figure 3.40: Predicted average annual deposition for TSP for the proposed Vlaklaagte project operations when mitigated.

Figure 3.41: Predicted highest monthly deposition for TSP for the proposed Vlaklaagte project operations when unmitigated.

Figure 3.42: Predicted highest monthly deposition for TSP for the proposed Vlaklaagte project operations when mitigated.

Table 3.23: Impact Assessment

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Heritage											
Subsurface activity	Subsurface culturally significant material	Destruction of subsurface culturally significant material	Construction and development	Negative	20	Low-Med	Negative	8	Low	Monitor material unearthed	Monitor subsurface material during development and construction phases and contact a qualified archaeologist should culturally significant material be observed
Noise											
Construction and clearing activities	Offloading of construction materials; Excavations and backfilling where required; Use and maintenance of roads; Machinery noise from construction related activities.	Increased Noise levels	Construction	Negative	10	Low	Negative	6	Low	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Operational Activities	Use and maintenance of haul roads Removal of material (mining process) and stockpiling, Machinery and excavation noise, Trucks clearing their load bins before loading,	Increased Noise levels	Operation	Negative	48	Med	Negative	28, 8	Low-Med	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads
Decommissioning activities	Demolition & Removal of all infrastructure Reshaping of mined area, Rehabilitation - spreading of soil, re-vegetation Aftercare and maintenance of rehabilitated areas.	Increased Noise levels	Closure and Decommissioning	Negative	20	Low-Med	Negative	12	Low	Equipment Maintenance Implement Road rules.	• mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. Avoid the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment.
Ecological Impacts											

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Mining Activities	Clearance and removal of Habitat Increase in vehicle and machinery movement	Loss of species of conservation concern	Construction and Operation	Negative	18	Low	Negative	7,2	Low	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.	• Search and rescue for reptiles and other vulnerable species, before areas are cleared • Environmental induction for all staff and contractors on-site Rehabilitate in line with the rehabilitation guidelines, this includes the clearing of alien vegetation, following the guidelines of a suitable alien invasive plant management plan. • The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological. • Ongoing alien plant control must be undertaken in the disturbed areas • Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden. • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas directly after mining ceases so as to stabilise against erosion and sedimentation.
Mining Activities	Vegetation clearance Opencast Mining	Loss of indigenous vegetation, floral and faunal habitat and ecological structure of water resources and soil	Construction and Operation	Negative	18	Low	Negative	7,2	Low	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.	• Search and rescue for reptiles and other vulnerable species, before areas are cleared • Environmental induction for all staff and contractors on-site Rehabilitate in line with the rehabilitation guidelines, this includes the clearing of alien vegetation, following the guidelines of a suitable alien invasive plant management plan. • The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological. • Ongoing alien plant control must be undertaken in the disturbed areas • Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden. • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas directly after mining ceases so as to stabilise against erosion and sedimentation.

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Disturbance of the environment	Clearance of vegetation Inadequate Rehabilitation	increase in Alien Invasive species	Construction, Operation, Decommissioning and Closure	Negative	18	Low	Negative	7,2	Low	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.	• Search and rescue for reptiles and other vulnerable species, before areas are cleared • Environmental induction for all staff and contractors on-site Rehabilitate in line with the rehabilitation guidelines, this includes the clearing of alien vegetation, following the guidelines of a suitable alien invasive plant management plan. • The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological. • Ongoing alien plant control must be undertaken in the disturbed areas • Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden. • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas directly after mining ceases so as to stabilise against erosion and sedimentation.
Construction and operational activities	Increased traffic Use of heavy machinery Stormwater infrastructure Bank Erosion	Flow alterations due to erosion and sedimentation	Construction and Operation	Negative	54	Med	Negative	43, 2	Med		• Design and implementation of a suitable stormwater system; • Implement a programme for the clearing/eradication of alien species including long term control of such species; • A 50 m buffer implemented for the wetland system; • Water quality monitoring must take place every month during operational phases; and • Wetland monitoring and biomonitoring must take place bi-annually. • A topsoil stripping and stockpiling guideline must be completed to ensure rehabilitation success. • Attenuation measures must include, but are not limited to - the use of sand bags, erosion control blankets, and silt fences. • Long term attenuation measures, such as attenuation/infiltration trenches, swales must be established to control stormwater from hardened surfaces • Vegetation clearing must be undertaken as and when necessary in phases. • Install sediment barriers (silt catchers and Reno mattresses) along any drainage areas to prevent the migration of silt.
Construction and operational activities	Potential accidental spills of hydrocarbon materials Hazardous materials entering the watercourses Acid Mine Drainage Increased road runoff during rainfall events	Pollution of watercourse	Construction, Operation	Negative	72	Med-High	Negative	57, 6	Med	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the watercourse Erosion control measures must be employed where required.	

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Operational, decommissioning and rehabilitation activities.	Increased runoff from hardened surfaces Further spread of plants and seedlings Increased traffic	Spread of alien vegetation	Operational, Closure and Decommissioning	Negative	64	Med-High	Negative	51,2	Med		• Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. • All roads need to be maintained and any erosion ditches forming along the road filled and compacted. • Demarcate wetland areas to avoid unauthorised access. • No washing of any equipment in close proximity to a watercourse is permitted. • No releases of any substances that could be toxic to fauna or faunal habitats within the channels or any watercourses is permitted. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities • Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. The general consensus is that they should be within 30 m to 50 m of a work face • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.
Groundwater											
Surface clearing and preparation.	Removal of vegetation.	Increase in surface run-off and therefore decrease in aquifer recharge.	Construction	Negative	14	Low	Negative	12	Low	Re-vegetate.	Rehabilitation plan.
Box cut opening.	Dewatering.	Decrease in water level should the pit floor be lower than the water level.	Construction	Negative	26	Med-High	Negative	26	Med-High	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.	Quarterly monitoring of monitoring boreholes.
Topsoil and overburden stockpiling.	Leaching from stockpiles.	Acid generation in the case of carbonaceous material placement.	Operation	Negative	20	Low-Med	Negative	12	Low	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.
ROM stockpiling.	Leaching from stockpiles.	Acid generation as a result of carbonaceous material.	Operation	Negative	24	Low-Med	Negative	14,4	Low	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Pollution Control Dam	Seepage should lining fail or dam overflow	Contaminated water in the dams can seep to the aquifer.	Operation	Negative	20	Low-Med	Negative	12	Low	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes.
Hydrocarbon spills.	Plume migration.	Spills from mining vehicles can infiltrate to the aquifer and cause a down gradient plume migration.	Operation	Negative	14	Low	Negative	12	Low	Clean any hydrocarbon spills in the appropriate manner.	Report any hydrocarbon spillage.
Pit dewatering	Dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	Operation	Negative	80	High	Negative	80	High	No management can be incorporated to limit the impacts of dewatering.	Quarterly Monitoring. Compensate users for losses. Monitor pit inflow rates, Annual Monitoring report, Update Numerical Model.
Topsoil and overburden removal.	Placement of topsoil and overburden into pit.	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the exposure to oxygen and potential acid generation.	Closure and decommissioning	Negative	14	Low	Negative	12	Low	Remove the top soil and overburden dumps during rehabilitation. Placement of carbonaceous material at bottom of pit.	Rehabilitation Plan- placement of topsoil and overburden in pit.
Backfilling	Reshaping of area	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	Decommissioning	Negative	20	Low-Med	Negative	12	Low	Carbonaceous material at deeper base of pit. Rehabilitation to direct surface runoff away from pit and recharge to pit minimized. Flow paths including fracture zones sealed.	Refer to rehabilitation plan.

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Revegetation	Reshaping of area and revegetating the area.	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	Rehabilitation	Negative	14	Low	Negative	12	Low	Remove the ROM stockpile and PCD's. This will eliminate the ROM stockpile and PCD's as potential sources.	Rehabilitation Plan
Backfilling of pit	Backfilling of the pit and no more dewatering.	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	Residual	Negative	80	High	Negative	80	High	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (e.g. abstraction). Investigate implementation of cut-off trench.	Abstracted/decant water to be treated or handled in appropriate manner and within legislation. Continue quarterly monitoring post-closure.
Surface Water											
Construction activities	Vegetation clearance and site establishment	Sedimentation and pollution of the Olifants River	Construction Phase	Negative	33	Low-Med	Negative	13,2	Low	Separate clean and Dirty Water System	Construct and implement SWMP
Open pit Mining	Pit dewatering and drawdown	Reduction in Baseflow	Operational Phase	Ne	28	Low-Med	Ne	28	Low-Med	No mitigation available	N/A
Pit dewatering	Reduction to baseflow in the stream	Reduced Poor Quality Water input	Operational Phase	Positive	39	Low-Med	Positive	39	Low-Med	No mitigation required	N/A

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Operational Activities	Hydrocarbon spills Dirty Water release Sediment runoff	Water quality deterioration	Operational Phase	Negative	60	Med-High	Positive	36	Low-Med	Separate clean and Dirty Water System	Construct and implement SWMP
Closure of the mine	Groundwater rebound	Decant of poor quality water	Closure and Decommissioning	N a	32	Low-Med	P os	12, 8	Low	Treat decant water before release to the environment	Establish a Passive treatment system in the form of a constructed wetland or similar.
Air Quality											
Site establishment	Removal of topsoil and vegetation	Fugitive dust (containing TSP (total suspended particulate) as well as PM10 and PM2.5 giving rise to health impacts	Construction and Operational Phase	Negative	40	Med	Negative	32	Low-Med	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation	Demarcate areas of movement, and avoid areas where movement is not permitted. Topsoil should be re-vegetated. During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as (petroleum emulsions, polymers and adhesives) can be used for dust suppression on earth roads. When using bulldozers and graders, minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation)
Site establishment	Construction of surface infrastructure	Fugitive dust (containing TSP (total suspended particulate) as well as PM10 and PM2.5 giving rise to health impacts	Construction and Operational Phase	Negative	40	Med	Negative	32	Low-Med	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation	Demarcate areas of movement, and avoid areas where movement is not permitted. Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed Time the blasting with wind to ensure the dust will not be blown to the sensitive receptors Material need to be removed to dedicated stockpiles to be used during rehabilitation Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin
General transportation	Hauling and vehicle movement on site	Fugitive dust (containing TSP (total suspended particulate) as well as PM10 and PM2.5 giving rise to health impacts	Construction and Operational Phase	Negative	40	Med	Negative	32	Low-Med	Avoid Dust Creation Enforce a low Speed limit	Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin Fit roads with Speed bumps

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Site closure	Demolition & Removal of all infrastructure	Fugitive dust (containing TSP (total suspended particulate) as well as PM10 and PM2.5 giving rise to health impacts	Decommissioning Phase	Negative	56	Med	Negative	44,8	Med	The area of disturbance must be kept to a minimum Avoid Dust Creation	Demolition should not be performed during windy periods (August, September and October) Demarcate areas of movement Speed restrictions should be imposed and enforced Exhaust pipes of vehicles should be directed so that they do not raise dust. Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. Dust suppression of roads being used during rehabilitation should be enforced.
Rehabilitation	Spreading of soil, revegetation & profiling/contouring	Fugitive dust containing TSP (total suspended particulate) as well as PM10 and PM2.5 giving rise to health impacts	Decommissioning Phase	Negative	56	Med	Negative	44,8	Med	Minimise exposed surface duration The area of disturbance must be kept to a minimum Avoid Dust Creation	Revegetation of exposed areas Demarcate areas of movement Spreading of soil must be performed on less windy days. Keep soil moist using sprays or water tanks, using wind breaks. Speed restrictions should be imposed and enforced Exhaust pipes of vehicles should be directed so that they do not raise dust.
Visual											
Construction related activities	Site Establishment	Potential visual impact on the viewpoints	Construction Phase	Negative	40	Med	Negative	24	Low-Med	The visual impact can be minimized creating a visual barrier.	Creating a Berm between the opencast pits and the town of Witbank and Planting Indigenous vegetation
Mining related activities	Open Pit Mining	Potential visual impact on Road and Land users	Operation, Decommissioning and Closure	Negative	64	Med-High	Negative	38,4	Low-Med	The visual impact can be minimized creating a visual barrier. Minimise areas of operation	Creating a Berm between the opencast pits and the town of Witbank and Planting Indigenous vegetation Perform concurrent rehabilitation as mining progresses
Soils, Land Use, Land Capability and Hydropedology											
Surface clearing and preparation	Removal of vegetation	Soil erosion from exposed soil surfaces	Construction	Negative	80	High	Negative	64	Med-High	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion	Regularly monitor areas where vegetation has been removed to detect early signs of soil erosion. In the case that soil erosion are detected, immediately implement preventative measures such as re-vegetation and/or make use of geotextiles to prevent any further erosion.
Surface clearing and preparation	Removal of topsoil and subsoil horizons above the overburden and coal seam	Removal of both topsoil and subsoil horizons increase the risk of groundwater pollution	Construction	Negative	80	High	Negative	48	Med	Limit areas where soil horizons are removed to that which are essential for the construction of infrastructure	Implement a well-designed Stormwater Management Plan that will direct polluted water into Pollution Control Dams. Restrict the removal of topsoil and subsoil to areas where it is essential for the construction of mine infrastructure

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Hydrocarbon spills	Vehicles and equipment moving over the soil surface	Pollution of soil with hydrocarbons	Construction	Negative	75	Med-High	Negative	30	Low-Med	Do regular checks on vehicles and equipment that are used during the construction phase to ensure that oil leakage and fuel spillage are minimised	Inspect vehicles and equipment on a weekly base during the construction phase. Any spills and leakages detected on site must be cleaned up immediately
Surface clearing and preparation	Removal of topsoil and subsoil horizons above the overburden and coal seam	Loss of pre-mining land capabilities	Construction	Negative	85	High	Negative	85	High	Mitigation measures will not be able to return the original land capabilities	The destruction of the current land capabilities are immediate and no action plans will result in a reduction of this impact.
Roll over mining	Earth moving and transport of ROM continues	Soil surfaces are increasingly compacted by vehicle and equipment movement	Operation	Negative	60	Med-High	Negative	48	Med	Vehicle and equipment should only move around on haul roads and park in designated areas	Parking areas and haul roads must be clearly demarcated. Any vehicle and equipment movement outside of these areas must be prohibited.
Roll over mining	Storage of stripped soil horizons in stockpiles	Soil erosion on soil stockpiles	Operation	Negative	80	High	Negative	48	Med	The slope of the topsoils stockpiles must not be more than 15% in order to limit erosion from the stockpiles.	Regularly monitor areas where vegetation has been removed to detect early signs of soil erosion. In the case that soil erosion are detected, immediately implement preventative measures such as re-vegetation and/or make use of geotextiles to prevent any further erosion.
Pit dewatering and dust control	Contaminated water are released on soil surfaces	Soil contamination with a range of pollutants	Operation	Negative	52	Med	Negative	20,8	Low-Med	Manage dirty and polluted water on site through storage and treatment with suitable infrastructure such as pollution control dams.	Conduct soil quality monitoring on a biannual base in all areas that are likely affected by contaminated water within the Vlaklaagte permit area.
Heavy machinery and vehicle movement	Vehicles and equipment moving over the soil surface	Compaction of surfaces will increase surface water run-off	Rehabilitation	Negative	36	Low-Med	Negative	36	Low-Med	Prepare the rehabilitated areas properly to promote quick vegetation re-establishment.	Monitor all areas where rehabilitation took place to determine where erosion gullies are present. In the case of measurable erosion, stabilise the areas with geo-textiles and vegetation immediately.
Resurfacing of areas with available topsoil	Covering rehabilitated areas with a layer of topsoil	Bare soil surfaces are at risk of soil erosion until vegetation cover has sufficiently established	Rehabilitation	Negative	45	Med	Negative	27	Low-Med	Vehicle and equipment should only move around on haul roads and park in designated areas	Determine the bulk density of soil as part of a rehabilitation audit. In areas with highly compacted surfaces, deep ripping and facilitated vegetation establishment must be implemented to promote vegetation growth.
Social Economic											

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Mine establishment	Mining operations	Employment and income opportunity	Construction and Operation Phase	Positive	55	Med	Negative	55	Med	Maximise Employment Opportunities, Skills and Enterprise Development	Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan during operations Put a procurement strategy as well as a contractor management plan (if relevant) in place to ensure that 100% local employment target in terms of unskilled labour is met Up-skill the local labour force as per an updated SLP Develop a database of goods and services that could potentially be outsourced to the local community Establish a supplier development programme as part of the Local Economic Development component of the SLP Where local contractors are used, put a contractor management plan in place to ensure that the local employment and procurement targets of the operations are met
Mining operations	Employee training	Upskilling of Labour force	Construction and Operation Phase	Pos	30	Low-Med	Ne	30	Low-Med	Promote Socio-Economic Development in the Local Area	Develop an updated Local Economic Plan as part of an updated SLP for the project in consultation with the local community. Some strategic recommendations: Determine whether the current allocation as per the mines MWP is in line with the targets of the Mining Charter of 2018 Monitor and manage the social contribution of multinational suppliers (in-house as well as suppliers to contractor and direct service providers)
Mining operations	Coal production and sales	Increased Public revenue	Construction and Operation Phase	Positive	36	Low-Med	Negative	36	Low-Med		
Mining operations	Social Development Plan	Increase in Local Economic Development Funds	Construction and Operation Phase	Positive	36	Low-Med	Negative	36	Low-Med		

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Mining operations	Employment creation	Project Induced In-Migration	Construction and Operation Phase	Negative	32	Low-Med	Negative	25, 6	Low-Med	Minimise Impacts of Project- Induced In-Migration	The local labour procurement strategy as well as proof of residence required should be clearly communicated in the local community and broader regional media well in advance of the construction phase. The communication strategy should ensure that unrealistic employment expectations are not created. Ensure that foreign (outside) workers reside in suitable facilities and do not establish informal houses. Information distributed as part of the existing HIV/Aids awareness campaigns undertaken in the area should again be focused on and communicated to the local workforce. The general health of workers should be monitored on an on-going basis Establish a forum, with representatives of the mine and local stakeholders for discussing potential issues of community conflict The area should be fenced off and security measures should ensure that no squatters are allowed on the mining right area The relevant actions related to this objective should form of the a contractor management plan

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Mining operations	Increased traffic Mining related hazards Increased dust Water quality deterioration Historical subsidence Blasting	Safety and Health Risks	Construction and Operation Phase	Negative	44	Med	Negative	26, 4	Low-Med	Minimise Safety and Health Risks	Permanent security personnel should be on site. The mining area must be fenced with electrical fencing and access to the area should be controlled to avoid animals or people entering the area without authorisation. Speed limits on the local roads surrounding the mining sites should be enforced The mining area should be equipped with surveillance around its perimeter. A Health and Safety Plan should be implemented and it must be ensured that all managers are qualified in First Aid and other relevant safety courses Ensure that a proper emergency plan that fits with the Municipal Disaster Management Plan is in place Implement a HIV/AIDS awareness programme as part of SLP with specific focus on communities in and nearby the mining areas, as well as on the mine employees Fire-fighting equipment should be on site and should be in a good working condition All mining vehicles should be in a good condition and adhere to the road worthy standards Access from haul roads and internal mine roads to local main roads should be in line with the road standard and requirements to accommodate the traffic load and traffic patterns. The mine to provide workers without transport with mine transport to and from work, with a safe off-loading site inside the mine premises Adhere to air pollution management plan to minimize health hazards related to coal dust particles and noxious gases Adhere to groundwater and surface water management measures to prevent any negative impacts on health due to ground or surface water pollution Suitable safety measures should be implemented to avoid subsidence

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Mining operations	Open pit establishment	Change in sense of place	Construction and Operation Phase	Negative	36	Low-Med	Negative	36	Low-Med	Minimise Negative Impacts of Nuisance Factors (Noise and Dust) Minimise Negative Impacts from Blasting Activities	The mitigation measures of the Noise and Air Quality Impact Assessments are relevant Dust suppression measures should be applied if and when necessary Limit the number of haul roads to limit dust creation. Operational mining activities with potential noise impacts should be mitigated and should not be undertaken during night time. Noise generating activities should thus be kept to normal working hours (e.g. 7 am until 5 pm) where possible Heavy machinery and heavy vehicles should be kept in a good working order. Also, ensure that all vehicles and equipment comply with generally accepted noise levels and noise abatement regulations Personnel should be equipped with the necessary noise protection equipment I&AP forum needs to be established to discuss and address issues of concern. Quarterly meetings are advised The Mine to maintain a complaints register for regular update as well as keep minutes of community forum meetings. Feedback should be provided on issues registered and resolved The mitigation measures of the Blasting Report are relevant. These include but is not limited to: • Use a qualified blasting expert • Close the provincial road during blasting in consultation with the relevant authority • Monitor noise levels from blasting to ensure it is not exceeded. • Establish a baseline of the structural condition of relevant structures (houses and public infrastructure) within a 1km radius of the operation. Inspect the structures on a 6 monthly basis or at public request. • Notify all I&APs an hour before blasting takes place • Conduct blasting in working hours (e.g. between 6:00 and 18:00)
Mining operations	Mine closure	Job losses	Decommissioning and Closure	N e	75	Med-High	N e	45	Med	Minimise the negative economic impacts related to mine closure	As per the requirements of the SLP develop mechanisms to assist employees, prior to retrenchment date in the transition

Activity	Aspect	Impact	Phase	+/-	Significance without mitigation		+/-	Significance with mitigation		Mitigation measures	Action Plan
Mining operations	Mine Closure	Decrease/termination of community investment funds and support to local communities	Decommissioning and Closure	Negative	70	Med-High	Negative	42	Med		phase after closure of the operations including portable skilled development programmes during the operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies etc. Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other costumers Plan community projects with an exit strategy of which beneficiaries are aware of The risk of ADM should be mitigated as per the ground water management plan Rehabilitate mining area as soon as possible to prevent to prevent high losses in agricultural potential Investigate the potential for a housing development as a high value post-closure land-use as well as a community priority as part of a final rehabilitation plan
Mine Closure	Water quality deterioration Historical subsidence	Safety and Health Risks	Decommissioning and Closure	Negative	48	Med	Negative	28, 8	Low-Med		

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

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

Table 3.24: Impact Criteria and Assigned Rating

Intensity (Magnitude)		**ASSIGNED QUANTITATIVE SCORE**
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it has a significant, moderate or insignificant		
(L)OW	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	**1**
(M)EDIUM	The affected environment is altered, but functions and processes continue, albeit in a modified way.	**3**
(H)IGH	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	**5**
Duration		
The lifetime of the impact, that is measure in relation to the lifetime of the proposed development.		
(S)HORT TERM	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.	**1**
(SM) SHORT - MEDIUM TERM	The impact will be relevant through to the end of a construction phase.	**2**
(M)MEDIUM	The impact will last up to the end of the development phases, where after it will be entirely negated.	**3**
(L)ONG TERM	The impact will continue or last for the entire operational lifetime (i.e. exceed 20years) of the development, but will be mitigated by direct human action or by natural processes thereafter.	**4**
(P)ERMANENT	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact is transient.	**2**
Spatial Scale/Extent		
Classification of the physical and spatial aspect of the impact		
(F)OOTPRINT	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	**1**
(S)ITE	The impact could affect the whole, or a significant portion of the site.	**2**
(R)EGIONAL	The impact could affect the area including the neighbouring Farms, the transport routes and the adjoining towns.	**3**
(N)ATIONAL	The impact could have an effect that expands throughout the country (South Africa).	**4**

(I)NTERNATIONAL	Where the impact has international ramifications that extend beyond the boundaries of South Africa.	**5**
Probability		
This describes the likelihood of the impact actually occurring. The impact may occur for any length of time during the life cycle of the activity. The classes are rated as follows:		
(I)MPROBABLE	The possibility of the Impact occurring is none, due to the circumstances or design. The chance of this Impact occurring is zero (0%)	**1**
(P)OSSIBLE	The possibility of the Impact occurring is very low, due either to the circumstances or design. The chance of this Impact occurring is defined as 25% or less	**2**
(L)IKELY	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of Impact occurring is defined as 50%	**3**
(H)IGHLY LIKELY	It is most likely that the Impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.	**4**
(D)EFINITE	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.	**5**
Weighting Factor		
Subjective score assigned by Impact Assessor to give the relative importance of a particular environmental component based on project knowledge and previous experience. Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance		
(L)OW		**1**
LOW- MEDIUM		**2**
MEDIUM (M)		**3**
MEDIUM-HIGH		4
HIGH (H)		5
Mitigation Measures and Mitigation Efficiency		
Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures		
Mitigation measures were recommended to enhance benefits and minimise negative impacts and address the following: Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make "educated guesses" based on professional experience; Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided; Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and		

Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.		
HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.	**0.2**
MEDIUM-HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels	**0.4**
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw	**0.6**
LOW -MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels	**0.8**
LOW	The impact will be mitigated to the point where it is of limited importance	**1.0**

Table 3.25: Description of bio-physical assessment parameters with its respective weighting

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Table 3.26: Significant Rating Scale Without Mitigation

Potential Impacts Without Mitigation Measures (WOM) Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).		
SIGNIFICANT RATING EQUATION Significant Rating (SR) = (Extent + Intensity + Duration) x Probability		
S=0	**INSIGNIFICANT**	The impact will be mitigated to the point where it is regarded as insubstantial
SR < 30	**LOW (L)**	The impact will be mitigated to the point where it is of limited importance.

20<SR<39	LOW- MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;
40> SR < 59	MEDIUM (M)	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
60<SR>79	MEDIUM-HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
80<SR > 100	HIGH (H)	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Table 3.27: Significant Rating Scale with Mitigation

Potential Impacts with Mitigation Measures (WM) – In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.		
SIGNIFICANT RATING WITH MITIGATION EQUATION Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency Or WM = WOM x ME		
S=0	INSIGNIFICANT	The impact will be mitigated to the point where it is regarded as insubstantial.
SR < 30	LOW (L)	The impact will be mitigated to the point where it is of limited importance.
20<SR<39	LOW- MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable. levels;
40> SR < 59	MEDIUM (M)	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
60<SR>79	MEDIUM-HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
80<SR > 100	HIGH (H)	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

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

Refer to Section 3.h.v and Table 3.23

3.h.viii Possible Mitigation Measure that could be applied and the level of risk

Refer to Section 3.h.v and Table 3.23

ACTIVITY	IMPACT	PHASE	MITIGATION MEASURES
Heritage			
Subsurface activity	Destruction of subsurface culturally significant material	Construction and development	Monitor material unearthed
Noise			
Construction and clearing activities	Increased Noise levels	Construction	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.
Operational Activities	Increased Noise levels	Operation	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.
Decommissioning activities	Increased Noise levels	Closure and Decommissioning	Equipment Maintenance Implement Road rules.
Ecological Impacts			
Mining Activities	Loss of species of conservation concern	Construction and Operation	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.
Mining Activities	Loss of indigenous vegetation, floral and faunal habitat and ecological structure of water resources and soil	Construction and Operation	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.
Disturbance of the environment	increase in Alien Invasive species	Construction, Operation, Decommissioning and Closure	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.
Construction and operational activities	Flow alterations due to erosion and sedimentation	Construction and Operation	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the watercourse Erosion control measures must be employed where required.
Construction and operational activities	Pollution of watercourse	Construction, Operation	
Operational, decommissioning and rehabilitation activities.	Spread of alien vegetation	Operational, Closure and Decommissioning	
Groundwater			
Surface clearing and preparation.	Increase in surface run-off and therefore decrease in aquifer recharge.	Construction	Re-vegetate.
Box cut opening.	Decrease in water level should the pit floor be lower than the water level.	Construction	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.
Topsoil and overburden stockpiling.	Acid generation in the case of carbonaceous material placement.	Operation	Should a contamination plume be detected, groundwater abstraction to contain plume.
ROM stockpiling.	Acid generation as a result of carbonaceous material.	Operation	Should a contamination plume be detected, groundwater abstraction to contain plume.
Pollution Control Dam	Contaminated water in the dams can seep to the aquifer.	Operation	Should a contamination plume be detected, groundwater abstraction to contain plume.
Hydrocarbon spills.	Spills from mining vehicles can infiltrate to the aquifer and cause a down gradient plume migration.	Operation	Clean any hydrocarbon spills in the appropriate manner.
Pit dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	Operation	No management can be incorporated to limit the impacts of dewatering.
Topsoil and overburden removal.	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the	Closure and decommissioning	Remove the top soil and overburden dumps during rehabilitation. Placement of carbonaceous material at bottom of pit.

ACTIVITY	IMPACT	PHASE	MITIGATION MEASURES
	exposure to oxygen and potential acid generation.		
Backfilling	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	Decommissioning	Carbonaceous material at deeper base of pit. Rehabilitation to direct surface runoff away from pit and recharge to pit minimized. Flow paths including fracture zones sealed.
Revegetation	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	Rehabilitation	Remove the ROM stockpile and PCD's. This will eliminate the ROM stockpile and PCD's as potential sources.
Backfilling of pit	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	Residual	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (e.g. abstraction). Investigate implementation of cut-off trench.
Surface Water			
Construction activities	Sedimentation and pollution of the Olifants River	Construction Phase	Separate clean and Dirty Water System
Open pit Mining	Reduction in Baseflow	Operational Phase	No mitigation available
Pit dewatering	Reduced Poor Quality Water input	Operational Phase	No mitigation required
Operational Activities	Water quality deterioration	Operational Phase	Separate clean and Dirty Water System
Closure of the mine	Decant of poor quality water	Closure and Decommissioning	Treat decant water before release to the environment
Air Quality			
Site establishment	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Construction and Operational Phase	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation
Site establishment	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Construction and Operational Phase	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation
General transportation	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Construction and Operational Phase	Avoid Dust Creation Enforce a low Speed limit
Site closure	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Decommissioning Phase	The area of disturbance must be kept to a minimum Avoid Dust Creation
Rehabilitation	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than	Decommissioning Phase	Minimise exposed surface duration The area of disturbance must be kept to a minimum Avoid Dust Creation

ACTIVITY	IMPACT	PHASE	MITIGATION MEASURES
	2.5 microns) giving rise to health impacts		
Visual			
Construction related activities	Potential visual impact on the viewpoints	Construction Phase	The visual impact can be minimized creating a visual barrier.
Mining related activities	Potential visual impact on Road and Land users	Operation, Decommissioning and Closure	The visual impact can be minimized creating a visual barrier. Minimise areas of operation
Soils, Land Use, Land Capability and Hydropedology			
Surface clearing and preparation	Soil erosion from exposed soil surfaces	Construction	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion
Surface clearing and preparation	Removal of both topsoil and subsoil horizons increase the risk of groundwater pollution	Construction	Limit areas where soil horizons are removed to that which are essential for the construction of infrastructure
Hydrocarbon spills	Pollution of soil with hydrocarbons	Construction	Do regular checks on vehicles and equipment that are used during the construction phase to ensure that oil leakage and fuel spillage are minimised
Surface clearing and preparation	Loss of pre-mining land capabilities	Construction	Mitigation measures will not be able to return the original land capabilities
Roll over mining	Soil surfaces are increasingly compacted by vehicle and equipment movement	Operation	Vehicle and equipment should only move around on haul roads and park in designated areas
Roll over mining	Soil erosion on soil stockpiles	Operation	The slope of the topsoils stockpiles must not be more than 15% in order to limit erosion from the stockpiles.
Pit dewatering and dust control	Soil contamination with a range of pollutants	Operation	Manage dirty and polluted water on site through storage and treatment with suitable infrastructure such as pollution control dams.
Heavy machinery and vehicle movement	Compaction of surfaces will increase surface water run-off	Rehabilitation	Prepare the rehabilitated areas properly to promote quick vegetation re-establishment.
Resurfacing of areas with available topsoil	Bare soil surfaces are at risk of soil erosion until vegetation cover has sufficiently established	Rehabilitation	Vehicle and equipment should only move around on haul roads and park in designated areas
Social Economic			
Mine establishment	Employment and income opportunity	Construction and Operation Phase	Maximise Employment Opportunities, Skills and Enterprise Development
Mining operations	Upskilling of Labour force	Construction and Operation Phase	Promote Socio-Economic Development in the Local Area
Mining operations	Increased Public revenue	Construction and Operation Phase	
Mining operations	Increase in Local Economic Development Funds	Construction and Operation Phase	
Mining operations	Project Induced In-Migration	Construction and Operation Phase	Minimise Impacts of Project- Induced In-Migration
Mining operations	Safety and Health Risks	Construction and Operation Phase	Minimise Safety and Health Risks
Mining operations	Change in sense of place	Construction and Operation Phase	Minimise Negative Impacts of Nuisance Factors (Noise and Dust) Minimise Negative Impacts from Blasting Activities
Mining operations	Job losses	Decommissioning and Closure	Minimise the negative economic impacts related to mine closure
Mining operations	Decrease/termination of community investment funds and support to local communities	Decommissioning and Closure	
Mine Closure	Safety and Health Risks	Decommissioning and Closure	

3.h.ix Motivation where no alternative sites were considered.

The project location was bound to the current location due to the underlying geology. The remaining extent of portion 45 of the farm Vlaklaagte 45 IS is located in the Witbank Coal Field, on areas previously mined through underground mining. The site is preferred due to the low ecological sensitivity, and the area already being owned by a mining company.

3.h.x Statement motivating the alternative development location within the overall site.

The resource location on the site restricts the infrastructure layout as well as the most optimal placement of the stormwater infrastructure which will ensure no release of dirty water to the environment.

3.i FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY.

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

The same impact ranking criteria and methodology was employed as discussed in Section 3.h.vi of this report.

3.j ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

Refer to Section 3.h.v and Table 3.23

3.k SUMMARY OF SPECIALIST REPORTS.

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

List of Studies Undertaken	Recommendations of Specialist Reports	Recommendations that Have Been Included in the EIA Report	Reference to Applicable Section of Report
Archaeological Impact Assessment	The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the area demarcated for development: • Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)). • Should the need arise to expand the proposed development beyond the surveyed area outlined in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated areas that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites. • From a heritage point of view, development may proceed on the demarcated mining block, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency..	X	This table, Section 1.a.i and Section 3.h.v
Geohydrological Assessment	Based on the findings of the geohydrological study it is highly recommended that a proposed monitoring protocol should be in place for the proposed project area.	X	This table, Section 1.a.i and Section 3.h.v
Aquatic & Wetland Specialist Assessment	It is recommended that all mining-related activities must to remain outside of the 50 buffer of the delineated	X	This table, Section 1.a.i and Section 3.h.v
Environmental Noise Impact Assessment	The following conditions are recommended from an environmental noise point of view: • Baseline environmental noise levels to be recorded on a quarterly basis for the first year after which the frequency can change to an annual basis; • An earthberm be constructed along the boundary of the mining area; • All acoustic screening measures must be in place before commissioning the mining activities; • Environmental noise monitoring to be carried out during the different phases of the project; • All noise sources at the different mining areas to be identified and registered; • The Noise Control Regulations, 1994 and/or noise control recommendations to be adhered to at all times.	X	This table, Section 1.a.i and Section 3.h.v
Soil, Land Use, Land Capability and	It is recommended an annual soil monitoring be conducted for the project lifecycle.	X	This table, Section 1.a.i and Section 3.h.v

List of Studies Undertaken	Recommendations of Specialist Reports	Recommendations that Have Been Included in the EIA Report	Reference to Applicable Section of Report
Agricultural Potential Assessment	The main mitigation measure for minimising the negative impact of compaction is to limit the areas affected by construction activities. Limiting heavy vehicle access to haul roads and construction areas only is especially important. Deep ripping is recommended to alleviate compaction before revegetation, especially if there is an attempt to restore the agricultural potential of the land.		
Visual Impact Assessment	It is recommended primary measures such as rehabilitation of the mining area by re-vegetation must be implemented should be implemented in order to minimise the visual impact by softening the visibility of the structures by "blending" with the surrounding areas. The following secondary measures have been recommended: • Planting some indigenous trees to create a barrier between the neighbours and roads; • Dust from Stockpile areas, roads and other activities must be managed by means of dust suppression to prevent excessive dust; • Planting indigenous vegetation on the berm and exposed areas; • Rehabilitation of the area must be done once mining is completed.	X	This table, Section 1.a.i and Section 3.h.v

3.I ENVIRONMENTAL IMPACT STATEMENT

3.I.i Summary of the key findings of the environmental impact assessment;

The most significant impacts after mitigation and with a cumulative medium to high significance are:

Table 3.28: Summary of key findings

Activity	Impact	Significance without mitigation	Significance with mitigation	Mitigation measures
Ecological Impacts				
Construction and operational activities	Flow alterations due to erosion and sedimentation	Med	Med	
Construction and operational activities	Pollution of watercourse	Med-High	Med	
Operational, decommissioning and rehabilitation activities.	Spread of alien vegetation	Med-High	Med	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the watercourse Erosion control measures must be employed where required.
Groundwater impacts				
Box cut opening.	Decrease in water level should the pit floor be lower than the water level.	Med-High	Med-High	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.
Pit dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level.	High	High	No management can be incorporated to limit the impacts of dewatering.
Backfilling of pit	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	High	High	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (e.g. abstraction). Investigate implementation of cut-off trench.
Surface Water				
Open pit Mining	Reduction in Baseflow	Low-Med	Low-Med	No mitigation available
Pit dewatering	Reduced Poor Quality Water input	Low-Med	Low-Med	No mitigation required
Operational Activities	Water quality deterioration	Med-High	Low-Med	Separate clean and Dirty Water System
Air Quality				
Rehabilitation	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Med	Med	Minimise exposed surface duration The area of disturbance must be kept to a minimum Avoid Dust Creation
Soils, Land Use, Land Capability and Hydropedology				
Surface clearing and preparation	Soil erosion from exposed soil surfaces	High	Med-High	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion
Surface clearing and preparation	Removal of both topsoil and subsoil horizons increase the risk of groundwater pollution	High	Med	Limit areas where soil horizons are removed to that which are essential for the construction of infrastructure
Surface clearing and preparation	Loss of pre-mining land capabilities	High	High	Mitigation measures will not be able to return the original land capabilities
Roll over mining	Soil surfaces are increasingly compacted by vehicle and equipment movement	Med-High	Med	Vehicle and equipment should only move around on haul roads and park in designated areas

Activity	Impact	Significance without mitigation	Significance with mitigation	Mitigation measures
Roll over mining	Soil erosion on soil stockpiles	High	Med	The slope of the topsoils stockpiles must not be more than 15% in order to limit erosion from the stockpiles.
Social Economic				
Mine establishment	Employment and income opportunity	Med	Med	Maximise Employment Opportunities, Skills and Enterprise Development
Mining operations	Job losses	Med-High	Med	
Mining operations	Decrease/termination of community investment funds and support to local communities	Med-High	Med	Minimise the negative economic impacts related to mine closure

3.I.ii Final Site Map

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

Figure 3.43: Sensitivity Map showing delineated wetland.

3.I.iii Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

Description	Advantages	Disadvantages
Beneficiation Alternatives		
On site beneficiation plant	• Additional employment opportunities, higher staff requirements. • No subsidence risk post-closure. • Less capital output on hauling of ROM	• Greater surface area disturbance. • Possible sterilisation of some of the coal resource as larger area is required for infrastructure • Change in land use required • More capital output on infrastructure • Increased noise from the use of construction and mining machinery on surface during operations. • Higher closure rehabilitation costs.

Description	Advantages	Disadvantages
Beneficiation Alternatives		
Offsite beneficiation (preferred method)	• Smaller footprint associated with surface disturbance. • Reduced impact on dust, noise and air quality. • Reduced closure rehabilitation costs. • The coal resource can be optimally mined as infrastructure will not sterilise the resource. • Less capital output on infrastructure	• Limited employment opportunities • Risk of subsidence post-closure if mining area is not adequately rehabilitated. • More capital output on ROM hauling

3.m PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR;

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

The objectives of impact mitigation and management are to:

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

Environmental impact management outcomes are:

- Efficient groundwater recharge
- Record of Groundwater Levels
- Limit of the extent of contamination plume
- Prevention of groundwater pollution
- Fair compensation for loss of groundwater
- Prolong period before decant and allow for decant to be of an acceptable quality
- Minimised impact on aquifer recharge
- Maintenance and improvement of water quality in the watercourse
- Limited noise disturbance.
- No soil erosion on site
- No soil compaction in areas outside of the construction / operation area.
- Preservation of topsoil and seed bank
- No soils pollution occurrence
- Offset of agricultural areas for sustainable co-existence
- Minimal dust nuisance
- Minimise the cumulative impact on sense of place
- Maintenance and conservation of heritage resources
- Increased employment in the local community
- Improved economic status locally
- health and safety issues within the community remain the same or improve
- Social uplifting of neighbouring communities.

3.n ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further

archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted

- Methods of handling the potential decant should be investigated, approved and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- Any development must occur outside of the recommended wetland buffer zone.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An Alien Invasive eradication plan should be compiled, approved and implemented.
- The applicant must have dust fallout monitoring points around the proposed mining area, and have the monitoring reports submitted to the Municipality on quarterly basis.

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

Visual

- Visual perception is by nature a subjective experience, as it is influenced largely by personal values. For instance, what one-viewer experiences as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. In order to limit such subjectivity, a combination of quantitative and qualitative assessment methods was used. A high degree of reliance has been placed on GIS-based analysis viewshed, visibility analysis, and on making transparent assumptions and value judgements, where such assumptions or judgements are necessary.
- The viewshed generated in GIS cannot be guaranteed as 100% accurate. Some viewpoints, which are indicated on the viewshed as being inside of the viewshed, can be outside of the viewshed. This is due to the change of the natural environment by surrounding activities as well as natural vegetation that play a significant role and can have a positive or negative influence on the viewshed.

Heritage

- The study areas consist of a harvested maize field that provided good visibility during the time of surveying and no access constraints were encountered (August 2020).

Wetland and Aquatics

It is difficult to apply pure scientific methods within a natural environment without limitations, and consequential assumptions need to be made. The following constraints may have affected this assessment:

- It must be noted that during the time of the assessment recent fires limited the identification of the grassveld vegetation and wetland vegetation within the study area;
- A hand-held Garmin eTrex 30 were used to delineate the watercourses had an accuracy of 3 m to 6 m;
- The findings, results, observations, conclusions and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the perceived impacts on the watercourses and biodiversity;
- The assessment in determining the present ecological state (PES) of the identified system was based on a single site visit. Site visits should ideally be conducted over differing seasons in order to better understand the vegetation, hydrological and geomorphologic processes driving the characteristics of the watercourse. In order to obtain a comprehensive understanding of the dynamics of the aquatic ecosystem in an area, ecological assessments should always consider investigations at different time scales (across seasons/years) and through replication, as river systems are in constant change; and
- The watercourse management and rehabilitation plan will need to be updated as more information about the dynamics of the system and its response to the implemented management measures are observed over time.

Groundwater

The following knowledge gaps, limitations and assumptions apply to the Trentra Vlaklaagte study area in terms of the groundwater study:

- No information on the status of the neighbouring mining activities were available. The impacts and inter-mine interactions can therefore not be determined.

- No site-specific information regarding groundwater users, aquifer hydraulics, groundwater quality is available for the project site. The Trentra Vlaklaagte study was based on studies in the nearby vicinity of the proposed project of which the groundwater characteristics are expected to be similar.
- Information regarding the coal floor was extracted from previous investigations in the area and no site-specific core drilling results were available for the extraction of the coal floor contours. The calculations in terms of drawdown, pit inflows and time to decant should be updated once the coal floor information becomes available.
- No acid-base analysis were performed and the mining activities were regarded as acid generating.

3.p REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

3.p.i Reasons why the activity should be authorized or not.

The EAP believes that the authorisation for the remaining portions of the activity should be granted.

The risks of the remaining proposed mining activity are minimal and can be mitigated by following the mitigation measures stipulated in the EMPr, which will reduce impacts significantly to acceptable levels.

3.p.ii Conditions that must be included in the authorisation

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted
- Methods of handling the potential decant should be investigated, approved and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- Any development must occur outside of the recommended wetland buffer zone.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- The applicant must have dust fallout monitoring points around the proposed mining area, and have the monitoring reports submitted to the Municipality on quarterly basis.
- An incident and complains register must be present on site and submitted to the Municipality on quarterly basis.

3.q PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.

3 Years.

3.r UNDERTAKING

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.

For the undertaking refer to Part B: EMP

3.s FINANCIAL PROVISION

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0		1	1	R -
2 (A)	Demolition of steel buildings and structures	m2	1	R 7 979.00	1	1	R 7 979.00
3 (A)	Demolition of steel buildings and structures	m3	1	R 6 402.00	1	1	R 6 402.00
2(B)	Demolition of reinforced concrete buildings and structures	m2	0		1	1	R -
3	Rehabilitation of access roads	m2	2901	R 44.00	1	1	R 127 644.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0		1	1	R -
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0		1	1	R -
5	Demolition of housing and/or administration facilities	m2	375	R 438.88	1	1	R 164 581.34
6	Demolition of housing and/or administration facilities	m2	110	R 135.00	1	1	R 14 850.00
6	Opencast rehabilitation including final voids and ramps	ha	1	R 239 999.95	0.52	1	R 124 799.98
7	Sealing of shafts adits and inclines	m3	3		1	1	R -
8 (A)	Rehabilitation of overburden and spoils	ha	0		1	1	R -
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0		1	1	R -
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0.02	R 239 999.95	0.8	1	R 2 880.00
9 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0.29	R 152 096.00	0.8	1	R 35 286.27
9	Rehabilitation of subsided areas	ha	0		1	1	R -
10	General surface rehabilitation	ha	0.54	R 47 080.24	1	1	R 25 423.33
11	River diversions	ha	0		1	1	R -
12	Fencing	m	1000	R 199.49	1	1	R 199 492.53
13	Water management	ha	1.5	R 372 560.00	0.67	1	R 374 422.80
14	2 to 3 years of maintenance and aftercare	ha	0.54	R 21 531.23	1	1	R 11 626.86
15 (A)	Specialist study	Sum	2	R 180 000.00	1	1	R 360 000.00
15 (B)	Specialist study	Sum	1	R 700 000.00	1	1	R 700 000.00
					Sub Total 1		2155388.103

1	Preliminary and General	258646.5724	weighting factor 2 1	R 258 646.57
2	Contingencies	215538.8103		R 215 538.81
			Subtotal 2	R 2 629 573.49
			VAT (15%)	R 368 140.29
			Grand Total	R 2 997 713.77

3.s.i Explain how the aforesaid amount was derived.

The NEMA regulations require that the closure costs be calculated according to real rates. CIGroup was appointed to undertake the closure costing and therefore sourced these rates from a third-party contractor specialising in demolition and rehabilitation.

In order to calculate the closure cost using the third-party contractor rates, each of the closure actions from the report were broken down into specific units (i.e. roads, power lines, buildings, discard dump, Dirty Water Storage Facilities etc.) within specific categories (i.e. Decommissioning, Closure, Rehabilitation and Care and Maintenance).

A bill of quantity was determined for each of the units and applied to the third-party contractor rates to determine a closure cost per unit. The unit costs determined the category costs and the category costs resulted in a preliminary closure cost also called Sub-Total 1. Contractors costs include a mobilisation and project management fee which represents 12% of the Subtotal 1 and is calculated into a Subtotal 2. A contingency of 10% was included on Subtotal 2 to obtain a Financial Liability Cost in Subtotal 3. Finally, a 15% VAT was added to Subtotal 3 to obtain a subtotal 4. Subtotal 3 is regarded as the Final closure liability of the mine.

3.s.ii Confirm that this amount can be provided for from operating expenditure.

The applicant confirms that this amount will be provided for.

3.t SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

3.t.i Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:

3.t.i.1 Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix D**.

Social Economic			
Mine establishment	Employment and income opportunity	Med	Med
Mining operations	Job losses	Med-High	Med
Mining operations	Decrease/termination of community investment funds and support to local communities	Med-High	Med

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

No Impacts are envisaged.

3.u OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.

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

The alternatives assessed and the impacts associated with the alternatives assessed have been fully presented in Section 3.h and Section 3.l.iii

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

4. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

4.a DETAILS OF THE EAP

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

Name of The Practitioner: Riana Panaino

Tel No.: 012 807 0383

Fax No. : 086 714 5397

e-mail address: riana@ecoe.co.za

4.b DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Site Preparation

Site preparation mainly deals with the stripping and stockpiling of topsoil prior to the mining activities commencing as this might affect the quality and quantity of available valuable topsoil resources. The main objectives of soil management are to:

- Minimal removing and stockpiling of topsoil due to historical mining activities;
- optimise the preservation and recovery of topsoil for rehabilitation;
- identify soil resources and stripping guidelines;
- identify surface areas requiring stripping (to minimise over clearing);
- manage topsoil reserves to not degrade the resource;
- identify stockpile locations and dimensions; and
- identify soil movements for rehabilitation use.

In accordance with the objective of providing sufficient stable soil material for rehabilitation and to optimise soil recovery, the following strategies have been adopted:

- stockpiles to be located outside proposed mine disturbance areas;
- construction of stockpiles by dozers rather than scrapers to minimise structural degradation;
- construction of stockpiles with a “rough” surface condition to reduce erosion hazard, improve drainage and promote revegetation; and
- revegetation of stockpiles with appropriate fertiliser and seed to minimise weed infestation, maintain soil organic matter levels, soil structure and microbial activity and maximise the vegetative cover of the stockpile depending on the exposure timeframes.

Disturbance areas will be stripped progressively (i.e. only as required) to reduce erosion and sediment generation, to reduce the extent of topsoil stockpiles and to utilise stripped topsoil as soon as possible for rehabilitation. Rehabilitation of disturbed areas (i.e. roads, embankments and stripped mining footprint) will be undertaken as practicable after these structures are completed or as areas are no longer required. Soil surveys over the open cut area, beneath proposed mine waste emplacements and other infrastructure areas will determine the depth of topsoil. It should be noted that it is important that for topsoil recovered from the areas it is required that underlying material is not inadvertently collected since it is unsuitable for reuse in rehabilitation.

A general protocol for soil handling is presented below and includes soil handling measures which optimise the retention of soil characteristics (in terms of nutrients and micro-organisms) favourable to plant growth:

- The surface of the completed stockpiles will be left in a "rough" condition to help promote water infiltration and minimise erosion prior to vegetation establishment;
- Topsoil stockpiles to have a maximum height of 3 m to limit the potential for anaerobic conditions to develop within the soil pile;
- Topsoil stockpiles to have an embankment grade of approximately 1V:4H (to limit the potential for erosion of the outer pile face);
- Topsoil stockpiles will be seeded and fertilised; and
- Soil rejuvenation practices will be undertaken if required prior to re-spreading as part of rehabilitation works.

Box Cut Opencast Mining with a Roll-over Rehabilitation Sequence

Opencast mining using the truck and shovel lateral sequential rollover mining method will be undertaken. Mining will commence from the initial box cut. A haul road that will be extended from the nearby existing road will be used as access to the mining area.

The soft overburden will be removed by mechanical methods. The hard overburden will be drilled and blasted and then removed by mechanical methods. The coal will be drilled and blasted prior to removal.

Replacement of overburden materials into the mining pit will be according to the following sequence:

4. Placement of hard overburden at base of pit;
5. Placement of soft overburden;
6. Final cover of topsoil (minimum 500 mm)

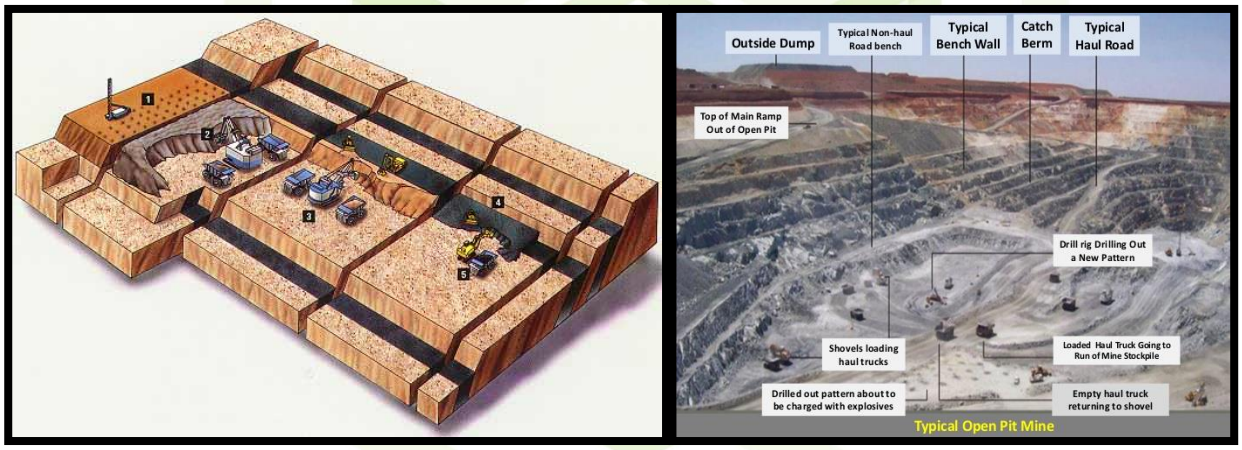

Figure 4.1: Typical Opencast Concurrent Roll Over Rehabilitation Mining Technique

ROM Coal

- The Run of Mine (RoM) will be loaded and hauled to the designated off-site beneficiation plant.

Access and Haul Roads Construction

The mine access road will lead off one of the dirt roads serving the purpose to only give farmers access to their properties. The dirt road will be upgraded to the applicable standards which includes a gravel road leading into the mine. The road will be used to access the mine offices, workshop complex, and mining area. Coal transportation trucks will also use this road to enter and exit the mine premises, including travelling to the weighbridge.

Semi Temporary Site and Security Offices

The site offices for the project, including a small security hut at the entrance of the mining area next to the main entrance road will consist of container-type offices that is commercially available as off the shelve products, as illustrated in the image below. This ensures minimal construction requirements on site and also minimal footprint. Keeping the disturbance area minimal and ensuring ease of mine closure

and rehabilitation after life of mine make the temporary offices ideal, especially considering the short duration of the proposed activities and requirement of these offices.

Figure 4.2: Typical semi temporary site offices and security office

Semi Temporary Sanitation and Change House

Similar to the structure indicated in the section above, will the semi temporary sanitation and change house also be container type facilities which can easily be brought to site and also removed after life of mine. For the change house and ablution facility a septic tank system will be implemented which is temporary of nature and can also be decommissioned easily. The septic tank system will ensure a 'honey-sucker' type sewage removal vehicle can remove and dispose of sewage at an appropriate facility off site. This ensures no major construction and approval is required for a full scale sewage treatment facility. Mobile chemical toilets will also be used where necessary and supplied by an approved contractor whom will be responsible for the management of these toilets. Water requirements relating to ablutions and drinking water are expected to be minimal and if water cannot be sourced on site from a borehole it will be brought in by a tanker. The current expectation is that 50 employees will require 45 litre per person per day (litre pp/day) amounting to 2 460 litres per day.

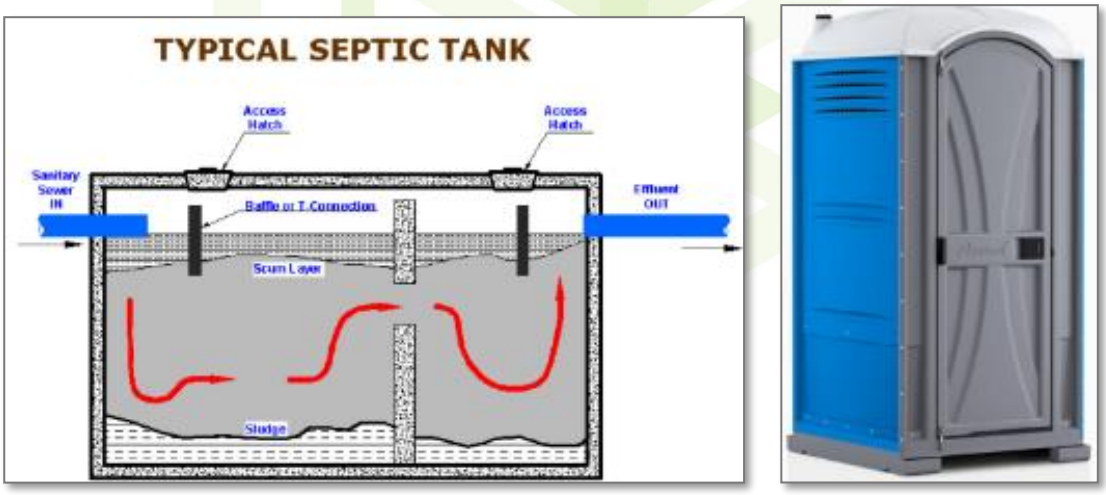

Figure 4.3: Typical septic tank cross section and chemical toilet illustration

Mobile Fuel Storage

The main fuel storage will be diesel in a mobile fuel storage tank with a drip tray designed to hold 110% the capacity of the tanks. The fuel bowser will be stored off site.

Figure 4.4: Typical mobile fuel storage trailer with bunded tray

Pollution Control Facility/Dam (Evaporation and Dust Suppression Usages)

Pollution control dams (PCDs) form an integral and important part of the water management systems on a mine. Different types of PCDs may exist on a mine site, such as process water dams, storm water dams, evaporation dams and other dams, possibly including excess mine water dams and natural pans.

The purpose of PCDs for the mine and in the water management circuits are to:

- Minimise the impact of polluted water on the water resource;
- Minimise the area that is polluted as far as possible, by separating out clean and dirty catchments; and
- Capture and retain the dirty water contribution to the PCDs that cannot be discharged to the water resource, due to water quality constraints, and manage this dirty water through recycling, reuse, evaporation and/or treatment and authorised discharge.

The image below is an illustration of the typical pollution control dam that will be constructed.

Figure 4.5: Lined pollution control dam (PCD) illustration

Clean and Dirty Water Separation

A detailed surface water management plan will be drawn up as part of the Water Use License Application including the determination of flood lines, identification of sensitive receptors and existing surface water systems and flow paths, and civil engineering design reports for the required trenches and water management facilities. The Geohydrological investigation will also feed into these designs as the anticipated pollution will be modelled. Trenching around the mining area forms part of the clean and dirty water separation and is to a large extent based on the water balance as calculated by the civil engineering team. The image below is a typical illustration of aspects to consider during the calculation of the opencast mining area water balance.

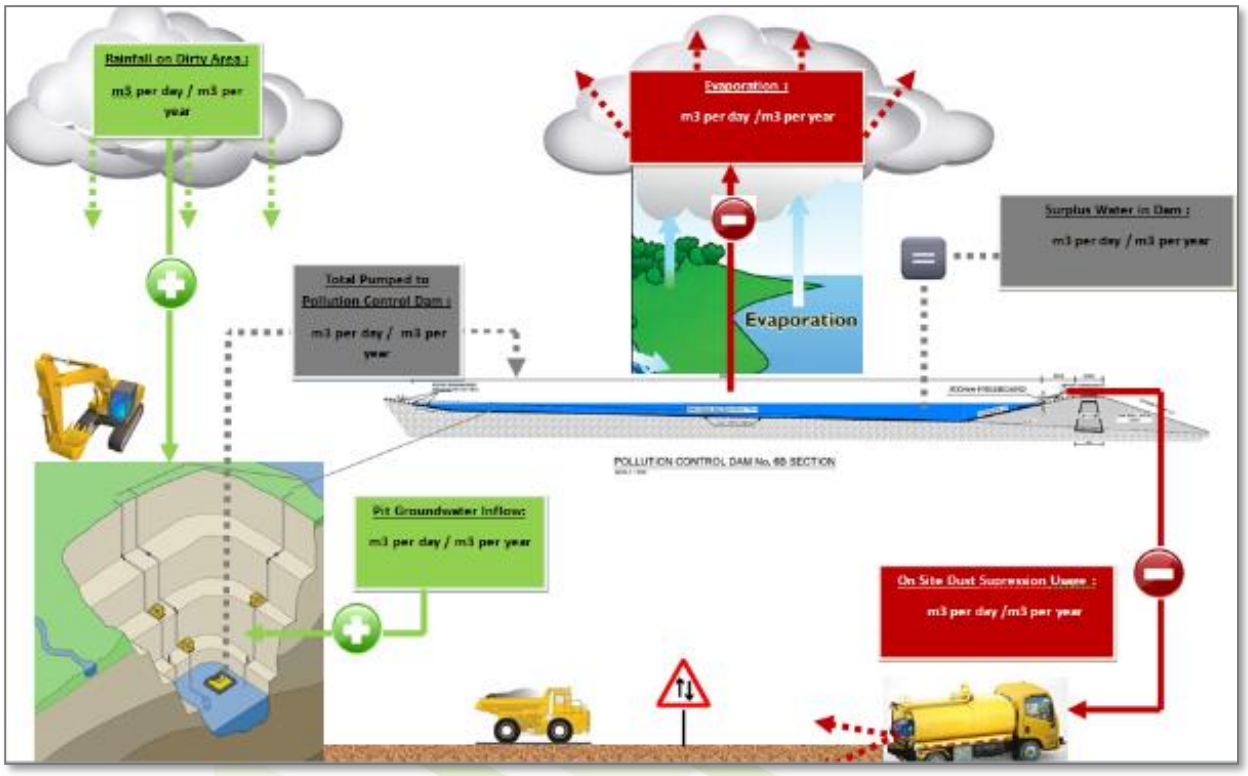

Figure 4.6: Typical water balance considerations during the design of a clean and dirty water separation system

Further images for clarification purposes have been provided below to indicating cross sections of both the dirty water and clean water diversion trenches which will be constructed around the mining area. These designs will also form part of the final master plan to be implemented during the Water Use License Application.

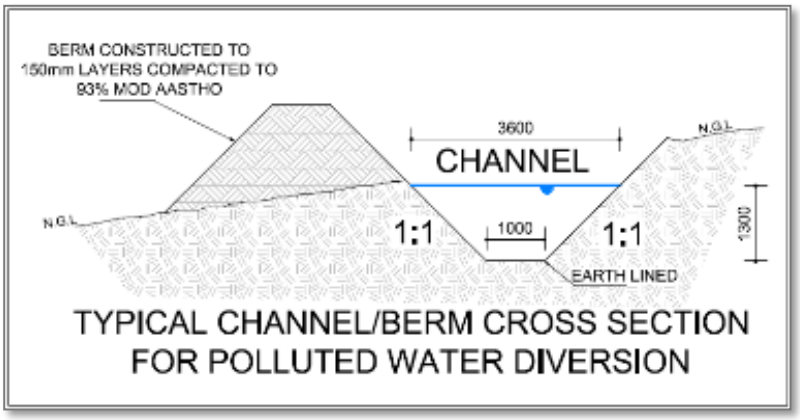

Figure 4.7: Typical Channel / Berm Cross Section For Polluted Water Diversion

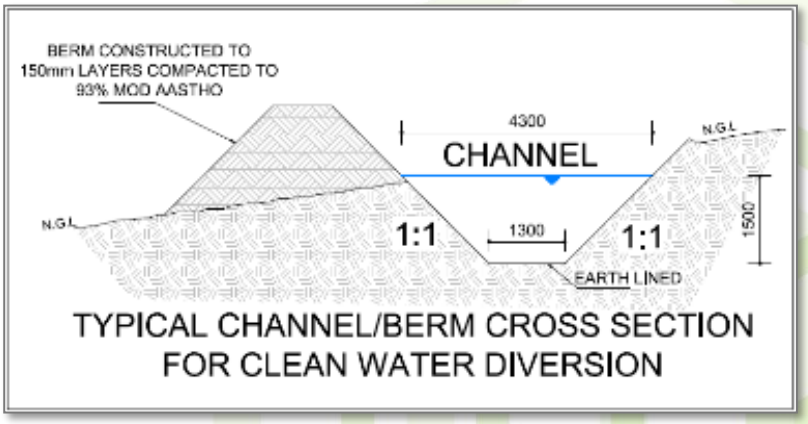

Figure 4.8: Typical channel/berm cross section for clean water diversion

Fencing

Fencing of the entire mining area will be required as a means of ensuring safety and also keeping trespassers at bay. Fences will be clearly demarcated and appropriate signage will be displayed, similar to the signs in the images below. Fencing of the sensitive receptors such as wetlands will also take place ensuring no mining personnel will enter these areas and that it will remain protected for the duration of the project. Sites of archaeological and heritage importance will also need to be fenced off while safe access to these sites will be provided. The necessary signage will also be erected at sites of archaeological and/or heritage importance to ensure visitors can easily and safely access the premises.

Figure 4.9: Typical mine fence signage

Staff and Visitors Parking

Designated parking areas will be constructed by compaction of the subsoil after removal, storage and preservation of the valuable layer of topsoil. Storm water management control around these areas will be implemented while the necessary signage will be erected to ensure optimal safety while reverse parking will be implemented at all parking bays. The necessary waste receptacles as well as oil spill kits will be provided at these sites in case of accidental spillage or leakage of hydrocarbon fuel/oil/greases from the vehicles.

Drilling and Blasting

Blasting of mine overburden to allow efficient recovery of the underlying coal can have impacts on the surrounding community. These impacts mainly include vibration through the air (overpressure) and earth (ground vibration) along with the generation of dust and fume. Overpressure and ground vibration limits in place for private residences and heritage structures are prescribed by government based on standards. Blasts are designed and managed to minimise the risk of exceeding these limits, and to minimise impacts they have on the community, surrounding structures and environment.

Due to the nature of the activities associated with open cast activities, blasting will mainly occur during the construction phase of the initial box cut, however, subsequent blasting to remove overburden and gain access to the mineral reserve will also take place during the life of mine. A suitably qualified blasting contractor will be appointed to construct a blasting design and conduct blasting activities. There will be no explosives magazine on site and the blasting contractor will be required to supply the explosives and consumables required to blast.

Topsoil, Subsoil, Overburden Stockpiles

All topsoil, subsoil and overburden material will be removed during the mining operation and stockpiled separately for the purpose of backfill rehabilitation. The topsoil stockpiles will not exceed a height of six meters which is high enough to reduce leaching impacts of stockpiled topsoil. The subsoil and overburden stockpiles will however exceed this height.

Waste Management

Waste will be generated from the start to the decommissioning of the project. It is proposed that the waste that would be generated on site would be managed by reducing, reusing and recycling as far as possible. A certified and approved external contractor will be responsible for the removal and disposal of the waste at a registered landfill

4.c COMPOSITE MAP

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

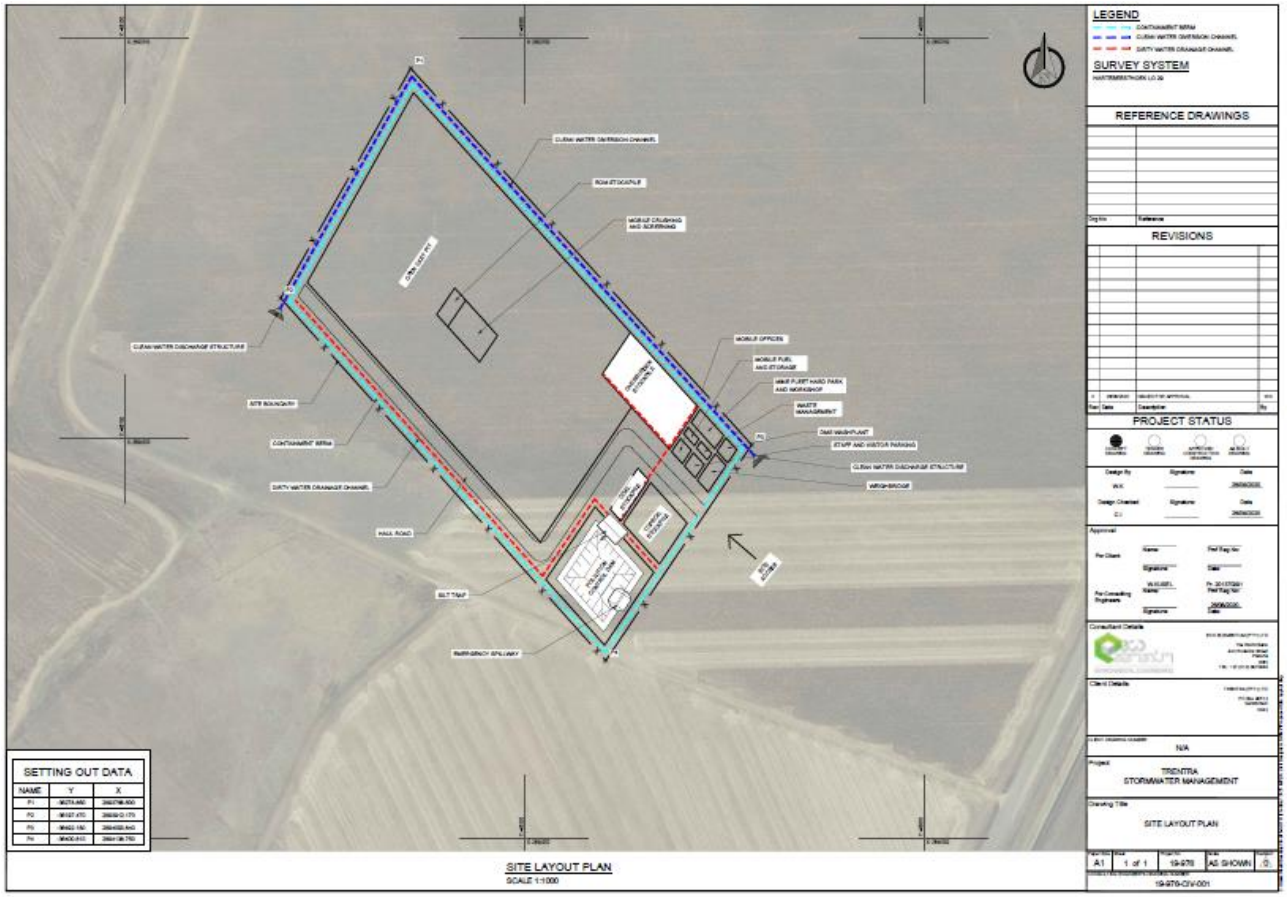

Figure 4.10: Conceptual site proposed layout

4.d DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.d.i Determination of closure objectives.

The closure vision is supported by the objectives as listed below;

- Create a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Sustain the long term catchment water yield and ensure suitable water quality;
- Rehabilitation of the surface infrastructure where necessary to minimize infiltration into the underground water regime (the philosophy of concentration and containment);
- Rehabilitation to minimise contamination of surface water resources (the philosophy of dilution and dispersion);
- Focus on establishing a functional post-mining landscape that would ensure self-sustaining agricultural practices post mine closure where possible;
- Ensure interconnectivity between the rehabilitated landscapes with surrounding regionally biologically diverse areas;
- Encourage, if and where required, the re-instatement of terrestrial and aquatic wetland biodiversity over time; and
- Create opportunities for alternative post-mining livelihoods by aligning to the regional planning;
- Meet with prevailing environmental legal requirements outlined in this report; and
- Prevent / Minimise negative impacts and risks as identified in this report.

4.d.ii Volumes and rate of water use required for the operation.

Only a small volume of water will be required for the mining activities. Approximately 500 m^3 of water will be used per day for mining activities.

Water will also be brought onto site for potable use, this is estimated at 5 litres per person/day.

4.d.iii Has a water use licence has been applied for?

A water use licence will be applied for, for activities that trigger Section 21 Water Uses.

4.d.iv Impacts to be mitigated in their respective phases.

Table 4.1: Impacts to be mitigated in their respective phases, Impact Management outcomes, Impact Management Action

Activity	Aspect	Impact	Phase	Mitigation measures	Action Plan	Mitigation and management objective	Mitigation and management Goals	Compliance with standards	Mitigation type	Time period for implementation
Heritage										
Subsurface activity	Subsurface culturally significant material	Destruction of subsurface culturally significant material	Construction and development	Monitor material unearthed	Monitor subsurface material during development and construction phases and contact a qualified archaeologist should culturally significant material be observed	Prevent impact on subsurface culturally significant material	Limit impact on subsurface culturally significant material	National Heritage Resources Act 25 of 1999	Control through management and monitoring	Prior to construction
Noise										
Construction and clearing activities	Offloading of construction materials; Excavations and backfilling where required; Concrete mixing and batching; Use and maintenance of roads; Machinery noise from construction related activities.	Increased Noise levels	Construction	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.	• A noise barrier in the form of a berm, tree break or similar noise fence should be constructed on the mine boundary • Construction and mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in use. • Fixed noise producing sources such as generators, pump stations and crushers to be to be either housed in enclosures or barriers put up around the noise source void the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads	Minimise noise disturbance	Zero noise disturbance complaints	SANS 10103	Control through management and monitoring	Prior to construction. Ongoing maintenance throughout LoM
Operational Activities	Use and maintenance of haul roads (incl. transportation of material to site and offsite), Removal of material (mining process) and stockpiling, Machinery and excavation noise, Trucks clearing their load bins before loading, Vehicle travelling to and from site on a daily basis.	Increased Noise levels	Operation	Construct a Noise Barrier between the main noise source noise sensitive receivers Equipment Maintenance Implement Road rules.		Minimise noise disturbance	Zero noise disturbance complaints	SANS 10103	Control through management and monitoring	Prior to construction. Ongoing maintenance throughout LoM
Decommissioning activities	Demolition & Removal of all infrastructure (incl. transportation off site), Reshaping of the area that was mined,	Increased Noise levels	Closure and Decommissioning	Equipment Maintenance Implement Road rules.	• mining-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers. • Switching off equipment when not in	Minimise noise disturbance	Zero noise disturbance complaints	SANS 10103	Control through management and monitoring	Ongoing maintenance throughout LoM

	Rehabilitation - spreading of soil, re-vegetation & profiling/contouring with heavy machinery, Aftercare and maintenance of rehabilitated areas.				use. Avoid the use of engine compression brakes when approaching the site entrance or driving through or in the vicinity of the adjacent town. • All access roads will be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to noisier equipment.					
Ecological Impacts										
Mining Activities	Clearance and removal of Habitat Increase in vehicle and machinery movement	Loss of species of conservation concern	Construction and Operation	• Avoidance of wetland areas as far as possible, these areas are regarded as highly sensitive areas Create Environmental Awareness • Any disturbed areas should be rehabilitated • Protect as much indigenous vegetation as possible • An alien invasive management programme must be incorporated into an Environmental Management Programme.	• Search and rescue for reptiles and other vulnerable species, before areas are cleared • Environmental induction for all staff and contractors on-site Rehabilitate in line with the rehabilitation guidelines, this includes the clearing of alien vegetation, following the guidelines of a suitable alien invasive plant management plan. • The site must be regularly monitored for re-growth of alien invasive species, and any new seedlings etc. eradicated using methods appropriate for the particular species, whether mechanical, chemical or biological. • Ongoing alien plant control must be undertaken in the disturbed areas • Herbicides must be carefully applied, in order to prevent any chemicals from entering the river. Spraying of herbicides within or near to the wetland areas is strictly forbidden. • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas directly after mining ceases so as to stabilise against erosion and sedimentation.	creating awareness and protection of species of conservation concern	Awareness and protection of species of conservation concern	0	Remedy through rehabilitation	Prior to construction with ongoing mitigation implementation during LoM
Mining Activities	Vegetation clearance Opencast Mining	Loss of indigenous vegetation, floral and faunal habitat and ecological structure of water resources and soil	Construction and Operation			To preserve and rehabilitate the area with indigenous vegetation	Effective rehabilitation of the post mining environment		Remedy through rehabilitation	Prior to construction with ongoing mitigation implementation during LoM
Disturbance of the environment	Clearance of vegetation Inadequate Rehabilitation	increase in Alien Invasive species	Construction, Operation, Decommissioning and Closure			prevent an increase in alien and invasive species.	effective management of alien and invasive species		Control through management and monitoring	Prior to construction with ongoing mitigation implementation during LoM
Construction and operational activities	Increased traffic Use of heavy machinery Stormwater infrastructure Bank Erosion	Flow alterations due to erosion and sedimentation	Construction and Operation	• Rehabilitation of the disturbed areas; • Limiting instream sedimentation; • Minimising pollutants entering the watercourse Erosion control measures must be employed where required.	• Design and implementation of a suitable stormwater system; • Implement a programme for the clearing/eradication of alien species including long term control of such species; • A 50 m buffer implemented for the wetland system; • Water quality monitoring must take place every month during operational phases; and	prevent undesirable change in surface water flow	improve and maintain natural flow where possible	0	Modify through design measures	Ongoing concurrent rehabilitation.
Construction and operational activities	Increased traffic leading to potential accidental spills of hydrocarbon materials Hazardous materials	Pollution of watercourse	Construction, Operation			prevent pollution of the downstream watercourse	Effective pollution and dirty water management of the mining		Control through management and monitoring	Ongoing concurrent rehabilitation.

	entering the watercourses Acid Mine Drainage Increased road runoff during rainfall events				• Wetland monitoring and biomonitoring must take place bi-annually. • A topsoil stripping and stockpiling guideline must be completed to ensure rehabilitation success.		site, and no pollution of the downstream watercourse			
Operational, decommissioning and rehabilitation activities.	Increased runoff from hardened surfaces Further spread of plants and seedlings Increased traffic	Spread of alien vegetation	Operational, Closure and Decommissioning		• Attenuation measures must include, but are not limited to - the use of sand bags, erosion control blankets, and silt fences. • Long term attenuation measures, such as attenuation/infiltration trenches, swales must be established to control stormwater from hardened surfaces • Vegetation clearing must be undertaken as and when necessary in phases. • Install sediment barriers (silt catchers and Reno mattresses) along any drainage areas to prevent the migration of silt. • Exposed soils must be rehabilitated as soon as practically possible to limit the risk of erosion. • All roads need to be maintained and any erosion ditches forming along the road filled and compacted. • Demarcate wetland areas to avoid unauthorised access. • No washing of any equipment in close proximity to a watercourse is permitted. • No releases of any substances that could be toxic to fauna or faunal habitats within the channels or any watercourses is permitted. • Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities • Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. The general consensus is that they should be within 30 m to 50 m of a work face • Re-instate indigenous vegetation (grasses and indigenous trees) in disturbed areas.	prevent an increase in alien and invasive species.	effective management of alien and invasive species		Control through management and monitoring	Ongoing concurrent rehabilitation.
Groundwater										
Construction activities	Oil and Diesel spills	Deterioration of groundwater quality	Construction phase	Water management facilities should be designed to intercept and	Implement SWMP and structures first, before further site establishment Apply passive water management	Implement effective water management	Effective water management	SANS241:2015	Control through management	Storm water Management to be constructed

				contain as much contaminated runoff and/or seepage as possible. Minimising the potential for water quality deterioration due to the oxidation of sulphide minerals Minimize the risk of spillages to the environment. Detect and prevent pollution at the earliest possible stage,	measures within the operations by reducing the available contact time between water and exposed sulphide minerals. Proper storage, handling and monitoring of fuel and chemicals used on site. Institute detailed monitoring systems	facilities to prevent groundwater contamination	and prevention of groundwater pollution.		and monitoring	prior to other infrastructure establishment
Operational Activities	Groundwater dewatering	Impact on Groundwater Quantity	Operational phase	No mitigation available	N/A	N/A	N/A	N/A	Control through management and monitoring	N/A
Operational Activities	Open pit mining	Impact on groundwater quality	Operational phase	Minimize the risk of spillages to the environment. Water management facilities should be designed to intercept and contain as much contaminated runoff and/or seepage as possible.	Proper storage, handling and monitoring of dirty water Proper storage, handling and monitoring of fuel and chemicals used on site. Implement SWMP	Prevent spills and pollution on site	Effective prevention of the pollution of the groundwater resource	SANS241:2015	Control through management and monitoring	Storm water Management to be constructed prior to other infrastructure establishment. Ongoing monitoring.
Closure of the mine	Groundwater rebound	Groundwater decant	Closure and Decommissioning	Treat decant water before release to the environment	Establish a Passive treatment system in the form of a constructed wetland or similar.	Treatment of poor quality decant to an acceptable quality	Release of acceptable quality water to the downstream environment	SANS241:2015	Remedy through control measures	Passive treatment establishment before mine closure.
Closure of the mine	Groundwater rebound	Pollution Plume spread	Closure and Decommissioning	No mitigation available	N/A	N/A	N/A	N/A	Control through management and monitoring	N/A
Surface Water										
Construction activities	Vegetation clearance and site establishment	Sedimentation and pollution of the Olifants River	Construction Phase	Separate clean and Dirty Water System	Construct and implement SWMP	To separate the clean water from entering the dirty water areas, and vice versa	Effective onsite dirty water management and retention.	SWMP	Modify through design measures	Storm water Management to be constructed prior to other infrastructure establishment
Open pit Mining	Pit dewatering and drawdown	Reduction in Baseflow	Operational Phase	No mitigation available	N/A	N/A	N/A	N/A	Modify through design measures	N/A

Pit dewatering	Reduction to baseflow in the stream	Reduced Poor Quality Water input	Operational Phase	No mitigation required	N/A	N/A	N/A	N/A	N/A	N/A
Operational Activities	Hydrocarbon spills Dirty Water release Sediment runoff	Water quality deterioration	Operational Phase	Separate clean and Dirty Water System	Construct and implement SWMP	To separate the clean water from entering the dirty water areas, and vice versa	Effective onsite dirty water management and retention.	SWMP	Modify through design measures	Storm water Management to be constructed prior to other infrastructure establishment. Ongoing monitoring.
Closure of the mine	Groundwater rebound	Decant of poor quality water	Closure and Decommissioning	Treat decant water before release to the environment	Establish a Passive treatment system in the form of a constructed wetland or similar.	Treatment of poor quality decant to an acceptable quality	Release of acceptable quality water to the downstream environment	ISO 5667: Grab Samples Water parameters as approved in the IWULA	Remedy through control measures	Passive treatment establishment before mine closure.
Air Quality										
Site establishment	Removal of topsoil and vegetation	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Construction and Operational Phase	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation	Demarcate areas of movement, and avoid areas where movement is not permitted. Topsoil should be re-vegetated. During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as (petroleum emulsions, polymers and adhesives) can be used for dust suppression on earth roads. When using bulldozers and graders, minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation)	Only clear areas required for immediate operation	minimal vegetation clearance and concurrent rehabilitation as mining progresses	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011	Control through management and monitoring	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas
Site establishment	Construction of surface infrastructure	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Construction and Operational Phase	Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur Reduce exposure areas Avoid Dust Creation	Demarcate areas of movement, and avoid areas where movement is not permitted. Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed Time the blasting with wind to ensure the dust will not be blown to the sensitive receptors Material need to be removed to dedicated stockpiles to be used during rehabilitation Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin	Only clear areas required for immediate operation	minimal vegetation clearance and concurrent rehabilitation as mining progresses	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011	Control through management and monitoring	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas

General transportation	Hauling and vehicle movement on site	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Construction and Operational Phase	Avoid Dust Creation Enforce a low Speed limit	Apply dust suppressant to roads. Cover Haul trucks with Tarpaulin Fit roads with Speed bumps	prevent excessive dust creation on site	Effective dust management on site	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011	Control through management and monitoring	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas
Site closure	Demolition & Removal of all infrastructure	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Decommissioning Phase	The area of disturbance must be kept to a minimum Avoid Dust Creation	Demolition should not be performed during windy periods (August, September and October) Demarcate areas of movement Speed restrictions should be imposed and enforced Exhaust pipes of vehicles should be directed so that they do not raise dust. Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. Dust suppression of roads being used during rehabilitation should be enforced.	prevent excessive dust creation on site	Effective dust management on site	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011	Control through management and monitoring	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas
Rehabilitation	Spreading of soil, revegetation & profiling/contouring	Fugitive dust (containing TSP (total suspended particulate) will give rise to nuisance impacts as fallout dust, as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns) giving rise to health impacts	Decommissioning Phase	Minimise exposed surface duration The area of disturbance must be kept to a minimum Avoid Dust Creation	Revegetation of exposed areas Demarcate areas of movement Spreading of soil must be performed on less windy days. Keep soil moist using sprays or water tanks, using wind breaks. Speed restrictions should be imposed and enforced Exhaust pipes of vehicles should be directed so that they do not raise dust.	prevent excessive dust creation on site	Rehabilitation of cleared areas	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827) SANS 1929:2011	Control through management and monitoring	Ongoing dust suppression throughout LoM. Concurrent rehabilitation of bare areas
Visual										
Construction related activities	Site Establishment	Potential visual impact on the viewpoints	Construction Phase	The visual impact can be minimized creating a visual barrier.	Creating a Berm between the opencast pits and the town of Witbank and Planting Indigenous vegetation	reduce the visual disturbance to the area	Effective visual barriers surrounding	n/a	Modify through design measures	Prior to construction

							the mining operation.			
Mining related activities	Open Pit Mining	Potential visual impact on Road and Land users	Operation, Decommissioning and Closure	The visual impact can be minimized creating a visual barrier. Minimise areas of operation	Creating a Berm between the opencast pits and the town of Witbank and Planting Indigenous vegetation Perform concurrent rehabilitation as mining progresses	reduce the visual disturbance to the area	Effective visual barriers surrounding the mining operation.	n/a	Modify through design measures	Prior to construction
Soils, Land Use, Land Capability and Hydropedology										
Surface clearing and preparation	Removal of vegetation	Soil erosion from exposed soil surfaces	Construction	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion	Regularly monitor areas where vegetation has been removed to detect early signs of soil erosion. In the case that soil erosion are detected, immediately implement preventative measures such as re-vegetation and/or make use of geotextiles to prevent any further erosion.	The area must have no to minimal signs of erosion that gullies that forms in areas where vegetation has been removed from the soil surface.	To minimise the areas where soil surfaces will be exposed to soil erosion	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Throughout construction
Surface clearing and preparation	Removal of topsoil and subsoil horizons above the overburden and coal seam	Removal of both topsoil and subsoil horizons increase the risk of groundwater pollution	Construction	Limit areas where soil horizons are removed to that which are essential for the construction of infrastructure	Implement a well-designed Stormwater Management Plan that will direct polluted water into Pollution Control Dams. Restrict the removal of topsoil and subsoil to areas where it is essential for the construction of mine infrastructure	Regularly monitor the quality of groundwater in boreholes around the areas of impact.	To minimise the areas where soil surfaces will be exposed to soil erosion	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Throughout construction
Hydrocarbon spills	Vehicles and equipment moving over the soil surface	Pollution of soil with hydrocarbons	Construction	Do regular checks on vehicles and equipment that are used during the construction phase to ensure that oil leakage and fuel spillage are minimised	Inspect vehicles and equipment on a weekly base during the construction phase. Any spills and leakages detected on site must be cleaned up immediately	The soil hydrocarbon levels must be monitored and remain below the values as indicated in the Framework for the Management of Contaminated Land	To avoid the contamination of soil resources on site and around the site with hydrocarbons	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Throughout mining, implement concurrent rehabilitation
Surface clearing and preparation	Removal of topsoil and subsoil horizons above the overburden and coal seam	Loss of pre-mining land capabilities	Construction	Mitigation measures will not be able to return the original land capabilities	The destruction of the current land capabilities are immediate and no action plans will result in a reduction of this impact.	Not efficient	Not efficient	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Immediately after topsoil removal.
Roll over mining	Earth moving and transport of ROM continues	Soil surfaces are increasingly compacted by vehicle and equipment movement	Operation	Vehicle and equipment should only move around on haul roads and park in designated areas	Parking areas and haul roads must be clearly demarcated. Any vehicle and equipment movement outside of these areas must be prohibited.	To restrict areas of additional soil compaction during the	To prevent extensive soil compaction in Vlaklaagte	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Daily

						operational phase	mining permit areas			
Roll over mining	Storage of stripped soil horizons in stockpiles	Soil erosion on soil stockpiles	Operation	The slope of the topsoils stockpiles must not be more than 15% in order to limit erosion from the stockpiles.	Regularly monitor areas where vegetation has been removed to detect early signs of soil erosion. In the case that soil erosion are detected, immediately implement preventative measures such as re-vegetation and/or make use of geotextiles to prevent any further erosion.	The area must have no to minimal signs of erosion that gullies that forms in areas where vegetation has been removed from the soil surface.	To minimise the areas where soil surfaces will be exposed to soil erosion	N/A	Remedy through rehabilitation	N/A
Pit dewatering and dust control	Contaminated water are released on soil surfaces	Soil contamination with a range of pollutants	Operation	Manage dirty and polluted water on site through storage and treatment with suitable infrastructure such as pollution control dams.	Conduct soil quality monitoring on a biannual base in all areas that are likely affected by contaminated water within the Vlaklaagte permit area.	The soil salinity and anionic salt levels (Sulphate, nitrates and phosphates) must be monitored and remain below the values as indicated in the Framework for the Management of Contaminated Land	To avoid the contamination of soil resources on site and around the site with hydrocarbons	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Throughout operation
Heavy machinery and vehicle movement	Vehicles and equipment moving over the soil surface	Compaction of surfaces will increase surface water run-off	Rehabilitation	Prepare the rehabilitated areas properly to promote quick vegetation re-establishment.	Monitor all areas where rehabilitation took place to determine where erosion gullies are present. In the case of measurable erosion, stabilise the areas with geo-textiles and vegetation immediately.	To prevent soil erosion from rehabilitated surfaces.	To prevent soil losses through erosion from the Vlaklaagte permit area	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Daily
Resurfacing of areas with available topsoil	Covering rehabilitated areas with a layer of topsoil	Bare soil surfaces are at risk of soil erosion until vegetation cover has sufficiently established	Rehabilitation	Vehicle and equipment should only move around on haul roads and park in designated areas	Determine the bulk density of soil as part of a rehabilitation audit. In areas with highly compacted surfaces, deep ripping and facilitated vegetation establishment must be implemented to promote vegetation growth.	To alleviate soil compaction in the areas that were affected by coal mining at Vlaklaagte mining permit area.	To increase the infiltration rate and porosity of compacted soil profiles prior to mine closure	Soil Management Plan as per the Specialist Soils report	Remedy through rehabilitation	Daily
Social Economic										

Mine establishment	Mining operations	Employment and income opportunity	Construction and Operation Phase	Maximise Employment Opportunities, Skills and Enterprise Development	Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan during operations Put a procurement strategy as well as a contractor management plan (if relevant) in place to ensure that 100% local employment target in terms of unskilled labour is met Up-skill the local labour force as per an updated SLP Develop a database of goods and services that could potentially be outsourced to the local community Establish a supplier development programme as part of the Local Economic Development component of the SLP Where local contractors are used, put a contractor management plan in place to ensure that the local employment and procurement targets of the operations are met	Maximise local employment opportunities and develop skills during operations	Maximise local employment opportunities and develop skills during operations	As per SLP	Remedy through Social and Labour Plan	Prior to construction and throughout LoM
Mining operations	Employee training	Upskilling of Labour force	Construction and Operation Phase	Promote Socio-Economic Development in the Local Area	Develop an updated Local Economic Plan as part of an updated SLP for the project in consultation with the local community. Some strategic recommendations: Determine whether the current allocation as per the mines MWP is in line with the targets of the Mining Charter of 2018 Monitor and manage the social contribution of multinational suppliers (in-house as well as suppliers to contractor and direct service providers)	Promote socio-economic development in the local area	Promote socio-economic development in the local area	As per SLP	Remedy through Social and Labour Plan	Throughout LoM
Mining operations	Coal production and sales	Increased Public revenue	Construction and Operation Phase				Promote socio-economic development in the local area	As per SLP	Remedy through Social and Labour Plan	Throughout LoM
Mining operations	Social Development Plan	Increase in Local Economic Development Funds	Construction and Operation Phase				Promote socio-economic development in the local area	As per SLP	Remedy through Social and Labour Plan	Throughout LoM
Mining operations	Employment creation	Project Induced In-Migration	Construction and Operation Phase	Minimise Impacts of Project- Induced In-Migration	The local labour procurement strategy as well as proof of residence required should be clearly communicated in the local community and broader regional media well in advance of the construction phase. The communication strategy should ensure that unrealistic employment expectations are not created.	Minimise any potential negative impacts associated with the inflow of workers and jobseekers	Minimise any potential negative impacts associated with the inflow of workers and jobseekers	As per SLP	Remedy through Social and Labour Plan	Throughout LoM

					Ensure that foreign (outside) workers reside in suitable facilities and do not establish informal houses. Information distributed as part of the existing HIV/Aids awareness campaigns undertaken in the area should again be focused on and communicated to the local workforce. The general health of workers should be monitored on an on-going basis Establish a forum, with representatives of the mine and local stakeholders for discussing potential issues of community conflict The area should be fenced off and security measures should ensure that no squatters are allowed on the mining right area The relevant actions related to this objective should form of the a contractor management plan					
Mining operations	Increased traffic Mining related hazards Increased dust Water quality deterioration Historical subsidence Blasting	Safety and Health Risks	Construction and Operation Phase	Minimise Safety and Health Risks	Permanent security personnel should be on site. The mining area must be fenced with electrical fencing and access to the area should be controlled to avoid animals or people entering the area without authorisation. Speed limits on the local roads surrounding the mining sites should be enforced The mining area should be equipped with surveillance around its perimeter. A Health and Safety Plan should be implemented and it must be ensured that all managers are qualified in First Aid and other relevant safety courses Ensure that a proper emergency plan that fits with the Municipal Disaster Management Plan is in place Implement a HIV/AIDS awareness programme as part of SLP with specific focus on communities in and nearby the mining areas, as well as on the mine employees Fire-fighting equipment should be on site and should be in a good working condition All mining vehicles should be in a good condition and adhere to the road worthy	Limit any safety and health risks during operations	Limit any safety and health risks during operations	As per SLP	Remedy through Social and Labour Plan	Throughout LoM

					standards Access from haul roads and internal mine roads to local main roads should be in line with the road standard and requirements to accommodate the traffic load and traffic patterns. The mine to provide workers without transport with mine transport to and from work, with a safe off-loading site inside the mine premises Adhere to air pollution management plan to minimize health hazards related to coal dust particles and noxious gases Adhere to groundwater and surface water management measures to prevent any negative impacts on health due to ground or surface water pollution Suitable safety measures should be implemented to avoid subsidence					
Mining operations	Open pit establishment	Change in sense of place	Construction and Operation Phase	Minimise Negative Impacts of Nuisance Factors (Noise and Dust) Minimise Negative Impacts from Blasting Activities	The mitigation measures of the Noise and Air Quality Impact Assessments are relevant Dust suppression measures should be applied if and when necessary Limit the number of haul roads to limit dust creation. Operational mining activities with potential noise impacts should be mitigated and should not be undertaken during night time. Noise generating activities should thus be kept to normal working hours (e.g. 7 am until 5 pm) where possible Heavy machinery and heavy vehicles should be kept in a good working order. Also, ensure that all vehicles and equipment comply with generally accepted noise levels and noise abatement regulations Personnel should be equipped with the necessary noise protection equipment I&AP forum needs to be established to discuss and address issues of concern. Quarterly meetings are advised The Mine to maintain a complaints register for regular update as well as keep minutes of community forum meetings. Feedback should be provided on issues registered and resolved The mitigation measures of the Blasting	Limit nuisance factors relate to noise and dust Limit potential negative impacts on noise and infrastructure damage related to blasting activities	Limit nuisance factors relate to noise and dust Limit potential negative impacts on noise and infrastructure damage related to blasting activities	As per SLP	Remedy through Social and Labour Plan	Throughout LoM

					Report are relevant. These include but is not limited to: • Use a qualified blasting expert • Close the provincial road during blasting in consultation with the relevant authority • Monitor noise levels from blasting to ensure it is not exceeded. • Establish a baseline of the structural condition of relevant structures (houses and public infrastructure) within a 1km radius of the operation. Inspect the structures on a 6 monthly basis or at public request. • Notify all I&APs an hour before blasting takes place • Conduct blasting in working hours (e.g. between 6:00 and 18:00)					
Mining operations	Mine closure	Job losses	Decommissioning and Closure	Minimise the negative economic impacts related to mine closure	As per the requirements of the SLP develop mechanisms to assist employees, prior to retrenchment date in the transition phase after closure of the operations including portable skilled development programmes during the operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies etc. Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other costumers Plan community projects with an exit strategy of which beneficiaries are aware of The risk of ADM should be mitigated as per the ground water management plan Rehabilitate mining area as soon as possible to prevent to prevent high losses in agricultural potential Investigate the potential for a housing development as a high value post-closure land-use as well as a community priority as part of a final rehabilitation plan	Minimise the negative economic impacts related to mine closure	Minimise the negative economic impacts related to mine closure	As per SLP	Remedy through Social and Labour Plan	Prior to Mine closure
Mining operations	Mine Closure	Decrease/termination of community investment funds and support to local communities	Decommissioning and Closure				Minimise the negative economic impacts related to mine closure	As per SLP	Remedy through Social and Labour Plan	Prior to Mine closure
Mine Closure	Water quality deterioration Historical subsidence	Safety and Health Risks	Decommissioning and Closure				Minimise the negative economic impacts related to mine closure	As per SLP	Remedy through Social and Labour Plan	Prior to Mine closure

4.d.v Financial Provision

4.d.v.1 Determination of the amount of Financial Provision.

4.d.v.1.a Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The closure vision is supported by the objectives as listed below;

- Create a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Sustain the long term catchment water yield and ensure suitable water quality;
- Rehabilitation of the surface infrastructure where necessary to minimize infiltration into the underground water regime (the philosophy of concentration and containment);
- Rehabilitation to minimise contamination of surface water resources (the philosophy of dilution and dispersion);
- Focus on establishing a functional post-mining landscape that would ensure self-sustaining agricultural practices post mine closure where possible;
- Ensure interconnectivity between the rehabilitated landscapes with surrounding regionally biologically diverse areas;
- Encourage, if and where required, the re-instatement of terrestrial and aquatic wetland biodiversity over time; and
- Create opportunities for alternative post-mining livelihoods by aligning to the regional planning;
- Meet with prevailing environmental legal requirements outlined in this report; and
- Prevent / Minimise negative impacts and risks as identified in this report.

4.d.v.1.b Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The basic assessment report and environmental management programme will be provided to IAPs for review and comment for 30 days. The objective is to communicated to IAP's during the public consultation process.

4.d.v.1.c Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

The scheduling of actions for final rehabilitation, decommissioning and closure which will ensure avoidance, rehabilitation and management of impacts is presented in the table below. As the disturbance after construction occurs on surface, linking the rehabilitation plan to the mine works program is not meaningful. Rather, the schedule is linked to applicant's intention to undertake rehabilitation activities over a 1-year closure period at the end of the Life of Mine. The perceived schedule drivers of this plan are also indicated in the table. This schedule is based on implementing the actions described in this report and relates to the aspects considered in this section.

Aspect	Scheduling	
	Quarter 1	**Continuous**
Opencast workings	Concurrent backfilling sequence and removal of salvageable equipment	Topsoil stripping, handling, stockpiling, preservation and replacement in line with the general surface rehabilitation and revegetation actions prescribed in this report as land becomes available for rehabilitation.
Surface Infrastructure related to mining operations (including plant)	Removal, decommissioning and demolition of infrastructure	
Final void	Backfilling and sealing	
Contaminated land remediation	Hydrocarbons – Removal of fuel storage and refuelling bays	

Aspect	Scheduling
	Chemical – contaminated equipment removal
Quarter 2	
Pollution Control Dams	Management of stormwater in closure period, but capacity requirements can be assessed to remove upon closure
Waste Management Facilities	Removal, decommissioning and demolition of infrastructure
Roads and parking areas	Only roads required after closure to remain in place
Fencing and walling	Only fences required to remain after closure to stay in place
Quarter 3 - 4	
Water Management	Monitoring, measurement and management where required
Maintenance and aftercare	All rehabilitated areas

Appendix 4 requires that a spatial map or schedule, showing planned spatial progression throughout operations be included in the plan. However, as the spatial progression is limited to the mining footprint and the mine haul route, the inclusion of a plan showing the spatial progression will not add any further information than that included in the table above.

4.d.v.1.d Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The rehabilitation plan aims to provide a project site that is similar to the pre-mining environment through the shaping of backfilled areas, capping of boreholes, closing of trenches and vegetating of disturbed areas (where not within cultivated lands).

4.d.v.1.e Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0		1	1	R -
2 (A)	Demolition of steel buildings and structures	m2	1	R 7 979.00	1	1	R 7 979.00
3 (A)	Demolition of steel buildings and structures	m3	1	R 6 402.00	1	1	R 6 402.00
2(B)	Demolition of reinforced concrete buildings and structures	m2	0		1	1	R -
3	Rehabilitation of access roads	m2	2901	R 44.00	1	1	R 127 644.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0		1	1	R -
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0		1	1	R -
5	Demolition of housing and/or administration facilities	m2	375	R 438.88	1	1	R 164 581.34
6	Demolition of housing and/or administration facilities	m2	110	R 135.00	1	1	R 14 850.00
6	Opencast rehabilitation including final voids and ramps	ha	1	R 239 999.95	0.52	1	R 124 799.98
7	Sealing of shafts adits and inclines	m3	3		1	1	R -
8 (A)	Rehabilitation of overburden and spoils	ha	0		1	1	R -
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0		1	1	R -
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0.02	R 239 999.95	0.8	1	R 2 880.00
9 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0.29	R 152 096.00	0.8	1	R 35 286.27
9	Rehabilitation of subsided areas	ha	0		1	1	R -
10	General surface rehabilitation	ha	0.54	R 47 080.24	1	1	R 25 423.33
11	River diversions	ha	0		1	1	R -
12	Fencing	m	1000	R 199.49	1	1	R 199 492.53
13	Water management	ha	1.5	R 372 560.00	0.67	1	R 374 422.80
14	2 to 3 years of maintenance and aftercare	ha	0.54	R 21 531.23	1	1	R 11 626.86
15 (A)	Specialist study	Sum	2	R 180 000.00	1	1	R 360 000.00
15 (B)	Specialist study	Sum	1	R 700 000.00	1	1	R 700 000.00
					Sub Total 1		2155388.103

1	Preliminary and General	258646.5724	weighting factor 2 1	R 258 646.57
2	Contingencies	215538.8103		R 215 538.81
			Subtotal 2	R 2 629 573.49
			VAT (15%)	R 368 140.29
			Grand Total	R 2 997 713.77

4.d.v.1.f Confirm that the financial provision will be provided as determined.

The applicant hereby commits to undertaking to provide the calculated amount in the form of either method provided in section 53 of the MPRD Regulations and the financial provisioning regulations, 2015 Published under Government Notice R1147 (GN R. 39425 of 2015). It should however be noted that no new guideline for determining the quantum for closure and rehabilitation has been published and therefore the guideline published under the MPRDA regulation was used to assess the quantum for closure liability.

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

4.d.v.1.g Monitoring of Impact Management Actions (Table 4.2)

4.d.v.1.h Monitoring and reporting frequency (Table 4.2)

4.d.v.1.i Responsible persons (Table 4.2)

4.d.v.1.j Time period for implementing impact management actions (Table 4.2)

4.d.v.1.k Mechanism for monitoring compliance (Table 4.2)

Table 4.2: Monitoring compliance

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities (for the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
Construction, Operation and Decommissioning Activities	Water Quality	ISO 5667Grab Samples	Independent Specialist	Monthly as per WUL
Construction, Operation and Decommissioning Activities	Water Quantity	Water Balance to be Updated Annually Flow Meter Reading and Update of Datasheet	SHEQ/ Engineering	Daily
Construction, Operation and Decommissioning Activities	Bio-Monitoring	SASS 5 and IHAS Sampling Sites are to be established upstream and downstream of all Potential Impact	Aquatic Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Storm Water Management	Visual Inspection Check the system for blockages and possible spillage areas	SHEQ/ Engineering	After heavy rainfall
Construction, Operation and Decommissioning Activities	Biodiversity Assessment	Align the Fauna & Flora Compare the annual findings with those of the Baseline Studies	Ecologist	Annually
Construction, Operation and Decommissioning Activities	Alien Invasive Control Program (AICP)	Implement an Alien Invasive Control Programme. During the Biodiversity Assessment a qualified ecologist must be contracted to ensure that the implementation of the AICP are adequately addressed.	Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Vegetation and Rehabilitation	RSIP to be adhered to As specified in EMP	Ecologist	Bi-Annually

Source activity	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and responsibilities (for the execution of the monitoring programmes)	Monitoring and reporting frequency and time periods for implementing impact management actions
Construction, Operation and Decommissioning Activities	Groundwater Quality	SANAS Standards As specified in Geo-Hydro Report	Independent Specialist	Quarterly
Construction, Operation and Decommissioning Activities	Groundwater Levels	Depth meters Determine the groundwater fluctuation over a LOM	Independent Specialist	Determine the groundwater fluctuation over a LOM
Construction, Operation and Decommissioning Activities	Dust Fallout	Implement a Monitoring Programme Gravimetric Dust Fallout	To be analysed by an Accredited Laboratory Independent Specialist	Monthly
Construction, Operation and Decommissioning Activities	Environmental Noise & Vibration	Implement a Monitoring Programme SANAS Standards Noise monitoring are to be done to determine the effect of mining, and associated activities, on the receptors	Independent Specialist (Noise Specialist)	Annually
Construction, Operation and Decommissioning Activities	Visual Inspection of receptors	Implement Monitoring Schedule in-house Physical Census Any incidents of cracking must be recorded and addressed.	SHEQ/ Engineering	Before and After each blasting event

4.d.v.1.l Indicate the frequency of the submission of the performance assessment/ environmental audit report.

A performance assessment/ Environmental audit will be undertaken as stipulated in Table 4.2 above. The performance assessment will be conducted internally twice a year and by an external consultant annually throughout the life of operation as required under NEMA. This is conducted to assess the adequacy and compliance to the EMP, EA and the relevant legislation. The reports should be submitted to the DMR.

4.d.v.1.m Emergency Preparedness, Response and Environmental Awareness Plan

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

An environmental awareness training manual will be developed for the prospecting project.

All employees must be provided with environmental awareness training to inform them of any environmental risks that may result from their work and of the manner in which the risks must be dealt with to avoid pollution or the degradation of the environment.

Employees should be provided with environmental awareness training before operations start. All new employees should be provided with environmental awareness training. Environmental awareness and training is an important aspect of the implementation of the EMP. The onus is on the different parties involved in the various stages of the life cycle of the project to be environmentally conscious. Hence, it is suggested that all members of the project team are familiar with the findings of the site-specific EA report and the EMPr. For instance, the contractor is responsible for the lack of environmental knowledge of his/her crew members. The contractor could forward internal environmental awareness and training procedures to the project manager and environmental officer for comment prior to the commencement of the project. Likewise, the above is applicable to the programming, design, operations and maintenance, and decommissioning teams. Environmental awareness ensures that environmental accidents are minimized and environmental compliance maximized.

All staff and contractors will be submitted to an annual training / awareness course as to inform the staff of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment.

Section 39 (3) (c) requires that an applicant who prepares an Environmental Management Programme or Environmental Management Plan must "develop an environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risks which may result from the work and the manner in which the risks must be dealt with in order to avoid pollution and degradation of the environment". Environmental Awareness is required not only for management and employees (as described in Section 39 (3) (c) but also for visitors to the site. the following strategies and plans will be put into place for each of the parties.

Visitor Environmental Awareness

Visitor/sub-contractor environmental awareness will be generated through the provision of a signboard describing very briefly the environmental considerations applicable to them. The signboard should contain the following information:

- Statement of the applicant's commitment to environmental principles;
- List of the "rules" to which the visitor must abide. This will include:
  - No littering. Dispose of all waste in the bins provided;
  - No fires;
  - Stay on demarcated roadways and paths only;
  - Kindly report any environmental infringements they may notice;
  - Check your vehicle/equipment for diesel/oil leaks.

Senior and Middle Management Environmental Awareness:

Achieving environmental awareness at upper levels of management is slightly different from the process at the operational level. There is often a fair level of the general value of environmental awareness but site-specific issues will most often need to be communicated. This will be achieved by:

- Management must make themselves fully familiar with the EMPr;
- Ensuring that there is a spare copy of the approved EMPr at his/her disposal; management is encouraged to make notes in the document regarding the difficulty / ease of implementing the environmental management measures. These notes should be sent to the consultants to assist in future revisions of the EMPr;
- The manager must ensure that the operators perform regular monitoring of their workstations / areas.

During the management's execution of their activities/being at the site, the management must constantly be aware of and observant of especially the following:

- Dust levels - movement outside of demarcated areas;
- Litter management - general housekeeping;
- Erosion during rainy season.

Topsoil management - fuel/oil management/leaks/changes;

- Success of operational re-vegetation; and
- Alien vegetation.

Operator / Workforce Environmental Awareness:

Achieving environmental awareness amongst the operators and labour is probably the most important because they are usually present at the place where most environmental transgressions take place or in fact cause them. It is the aim of increased environmental awareness to reduce any such environmental transgressions.

Increasing environmental awareness at these levels can be achieved through the following strategies:

- Induction environmental training must take place prior to any contract period.
- Training: Each and every employee (contractor or not) must go through an environmental training process where at least the following items area covered:
    - The oil/fuel management policy must be explained to the employees. The reason for the policy must also be explained (i.e. to not impact on groundwater, surface water, soil quality etc.);
    - The domestic and industrial waste management policy & method must also form part of the training;
    - The topsoil handling method and the reasons for preserving topsoil (i.e. post prospecting re vegetation, erosion prevention etc.);
    - Alien vegetation management: How to recognize and remove such species;
    - Protection of the natural veld by not driving/manoeuvring or walking through the demarcated protection areas. Reporting that demarcation posts/tape is broken or removed;

Emergency management procedures such as dealing with oil spills or fires must also be drilled; and

- Such training will, in this case, be carried out by the site manager/resident engineer.

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

Training, as detailed above, will address the specific measures and actions as listed in the EMPr and also conditions of the EA. In this way the team will be provided the knowledge required to conduct the mining activities without resulting in environmental non-compliance, the liability of which would lie with the applicant. Secondly, informing the team of the EMPr will also assist the team in identifying if an impact is likely to occur / has occurred and communicate this appropriately to the Environmental Manager.

In order for appropriate action to be taken, proper communications network and reporting protocol must be established, with the team and the site manager reporting all environmental issues to the Environmental Manager and then all social issues to the General Manager.

The following specific information will be required by the competent authority:

- The financial provision will be reviewed annually.

1) UNDERTAKING

The EAP herewith confirms

a. the correctness of the information provided in the reports ☒

b. the inclusion of comments and inputs from stakeholders and I&APs ; ☒

c. the inclusion of inputs and recommendations from the specialist reports where relevant; ☒and

d. that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein. ☒

Signature of the Environmental Assessment Practitioner:

Name of Company:

Date:

-END-

APPENDIX A: EAP CV

APPENDIX B: PUBLIC PARTICIPATION REPORT

APPENDIX C: LAYOUT MAPS

APPENDIX D: SPECIALIST STUDIES