DIEP VAALBANK COAL – DRAFT EIA REPORT

DIEPSOILS INVESTMENTS (PTY) LTD
PROPOSED MINING RIGHT APPLICATION FOR COAL ON THE REMAINING EXTENT & PORTIONS 1, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12 OF THE FARM RIETKUIL 224 IS; PORTIONS 1, 2, 4, 6, 8, 9, 10, 11 & RE OF THE FARM VAALBANK 233 IS AND PORTION 5 OF THE FARM KALABASFONTEIN 232 IS

MAGISTERIAL DISTRICT OF BETHAL - MPUMALANGA PROVINCE

REFERENCE NO: MP 30/5/1/2/2/10187 MR

REPORT

ENVIRONMENTAL & PROJECT MANAGEMENT PROFESSIONALS

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL & ENGINEERING

DOCUMENT & QUALITY CONTROL

DOCUMENT NO. 30/5/1/2/2/10187 MR				
Revision	**Date**	**Preparation: (Responsible Person)**	**Approved**	**Description of Revision**
AA - draft	12/12/2017	Carene Kruger		Author and first draft for review / comments
BB- draft	08/01/2018	Vernon Siemelink		Author and technical Review
CC- draft	10/01/2018	Leoni le Roux		Quality review
DD - draft	05/03/2018	Vernon Siemelink		Final Review
EE - draft	05/03/2018	Vernon Siemelink		Final Review
Approved for distribution:				
0.0				Final report

QUALITY CONTROL BY

Nature of Signoff	Responsible Person	Role / Responsibility	Qualifications
Author	Carene Kruger	Environmental Assessment Practitioner	BSc. (Hons) Geography (UJ) (Cert.Sci.Nat.) (IAIA Member)
Quality Reviewer	Leoni le Roux	Administrator	Professional Secretary and Personal Assistant
Author and Reviewer	Vernon Siemelink	ISO 14001:2004 Auditor Director/Senior Environmental Consultant	BSSci: GeoSci (Hons) UP M(EnvMan) Environmental Management UP

DISCLAIMER

DECLARATION OF INDEPENDANCE

I, Vernon Siemelink, declare that;

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing
    - any decision to be taken with respect to the application by the competent authority; and
    - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

05/03/2018

_____ _____

Signature **Date**

Mr. Vernon Siemelink
BSSc Honn GeoScience (UP)
M (EnvMan) Environmental Management
ISO 14001:2004 Lead Auditor

EXECUTIVE SUMMARY

Notice is hereby given in terms of the Minerals and Petroleum Resources Act (Act No.28 of 2002) (as amended) ("MPRDA") and its associated Regulations, the National Environmental Management Act (Act No 107 Of 1998) (as amended) ("NEMA") including its associated Environmental Impact Assessment Regulations 2014 (as amended) and the National Water Act (Act No. 36 of 19980 ("NWA"), that Diepsoils Investments (Pty) Ltd applied for a Mining Right on the Remaining Extent and Portions 1,3,4,5,6,7,8,9,10,11 & 12 of the Farm Rietkuil 224 IS, Portions 1,2,4,6,8,9,10,11 & RE of the Farm Vaalbank 233 IS and Portion 5 of the Farm Kalabasfontein 232 IS in the Magisterial District of Bethal A prospecting right was awarded to the client on 05/05/2017 with reference MP30/5/1/1/3/2/1 (14429) PR.

Eco Elementum, as independent environmental practitioners have been appointed by Diepsoils Investments (Pty) Ltd to undertake to S&EIR process. This report constitutes the Scoping Report and is the first phase in the environmental assessment process. The purpose of the Scoping Report is to identify key environmental issues for further investigation during the Environmental Impact Assessment (EIA) phase of the project; and to outline the plan of study / terms of reference for the preparation of the EIA and EMPr.

LEGAL REQUIREMENTS

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

Mining Right (MPRDA & MPRD Regulations):

- Section 22

Environmental Authorisation (NEMA and EIA Regulations namely:

- GNR 983 - Activities 11,12,13,22,24,27&30;
- GNR 984 - Activities 6,15,17&21; and
- GNR 985 - Activities 2,4,10,12&14

Waste License (NEMWA - GNR 921)

- Category A - Activity 14 and Category B - Activity 7,10&11; and

An Integrated Water Use License 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; and

  (j) dewatering of underground workings.

LOCATION

The proposed Mining Right area comprises over 5,626 hectares in extent, is located approximately 15 km northeast of Bethal, and can be accessed via R38 from Bethal and turning east into the project area, within the Msukaligwa Local Municipality, Gert Sibande District Municipality in Mpumalanga.

PROJECT DESCRIPTION

- Mineral: Coal;
- Mining Method: Underground board-&-pillar (See illustration in Figure 3);
- Depth of mining: Average depth between 40 m – 146 m below surface;
- Air vents: Two ventilation shafts required;

- Life of Mine: +20 years; and
- Product Market: Sudor Coal & Eskom.

MINING PROCESS

The underground will be accessed via a decline shaft. It is proposed that the decline shaft, plant and associated mine infrastructure be located on Portion 5 of the farm Kalabasfontein IS (see Map 2). Coal will be transferred from the underground to surface by means of a conveyor belt. Whereby, it will be sent to the plant area for processing (crushing, screening and washing). Mine residue from the plant will be disposed of onto an integrated disposal dump. Product coal will be sized and stockpiled in designated areas for pre-qualification prior to being trucked to market. It is currently anticipated that the plant will run 24/7.

ALTERNATIVES

- Alternative 1 (Preferred Alternative): Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 5 of the farm of the Kalabasfontein 232 IS.
- Alternative 2 (Site Alternative): Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 10 of the Farm Rietkuil 224 IS.
- Alternative 3 (Layout Alternative): To be drawn up and assessed as part of the Final EIA report based on the outcomes of the current impact assessment process.

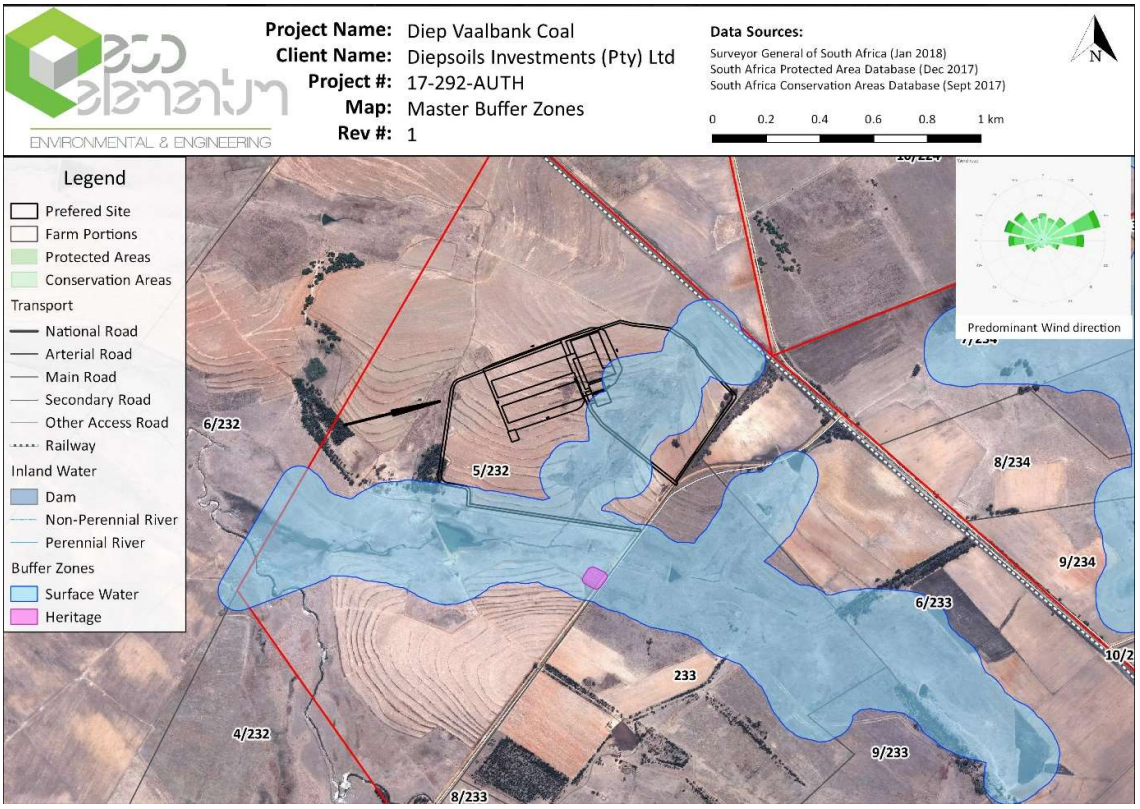


Figure 1: Preferred Layout and 100M buffer zone (Alternative 1 on the Farm Kalabasfontein)

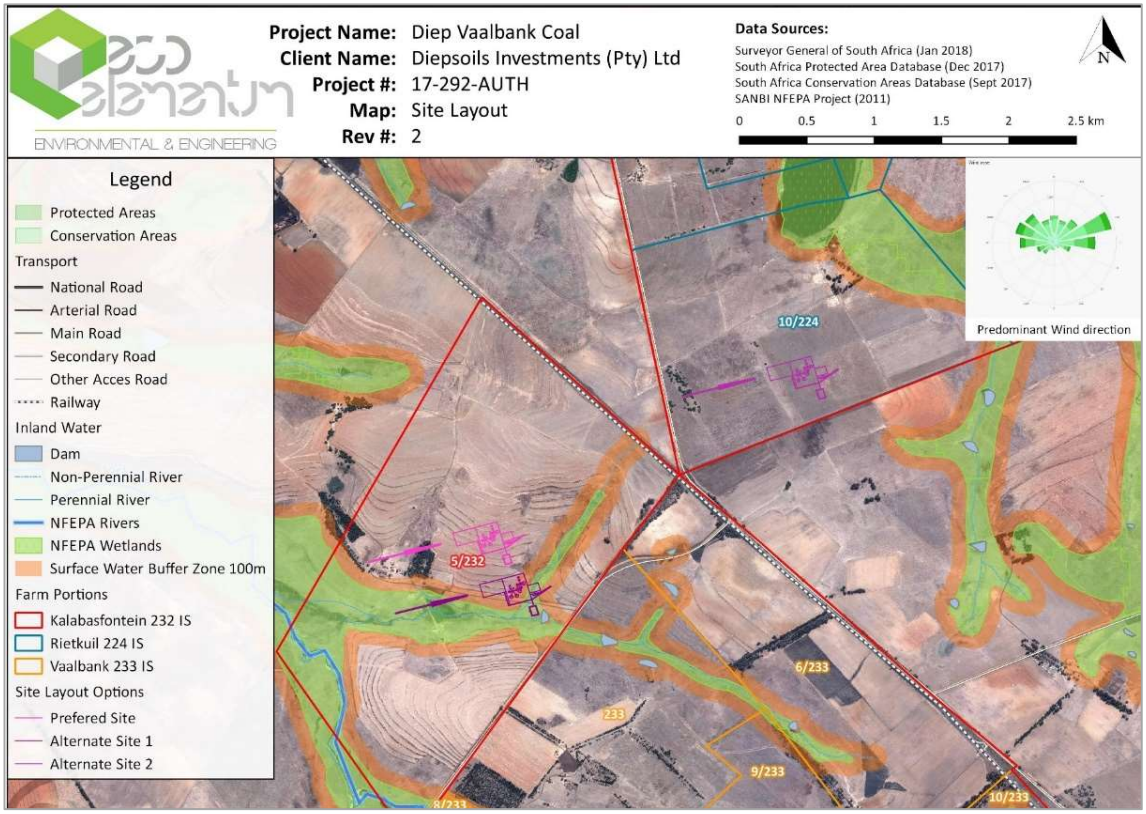


Figure 2: Project Alternatives

POTENTIAL IMPACTS

Table 1: Potential Significant Impacts of Alternative 1 and 2

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
CONSTRUCTION PHASE				
Alteration of Natural Topography	Medium	Low	Medium	Low
Soil Erosion	Medium	Low	Medium	Low-Medium
Soil Contamination	Medium - High	Low-Medium	Medium-High	Low-Medium
Change in land capability	Medium - High	Low-Medium	Low Medium	Low-Medium

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
Surface Water Pollution and Alteration of Natural Drainage Lines	High	Medium	Low-Medium	Low
Groundwater Pollution and Quantity	Medium	Low-Medium	Medium	Low-Medium
Terrestrial (Floral Damage and Alternation)	Medium	Low-Medium	Low	Low
Terrestrial (Faunal Displacement and Higher mortality rates)	Medium - High	Low-Medium	Medium	Low-Medium
Air Quality	Medium	Low-Medium	Medium	Low
Positive Economic Benefit	Medium	N/A	Medium	N/A
Altering of sense of place for local community	Medium	Low-Medium	Medium	Low-Medium
Rise in noise levels	Medium	Low-Medium	Medium	Low-Medium
Increase in traffic volumes and accident rates	Medium-High	Medium	Medium-High	Medium
Damage to heritage and archeological objects	Medium	Low	Medium-High	Low-Medium
Damage to Paleontological artefacts	Low-Medium	Low	Low-Medium	Low-Medium
OPERATIONAL PHASE				
Alteration of Natural Topography	Medium	Low	Medium	Low
Soil Erosion	Medium	Low	Medium	Low-Medium

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
Soil Contamination	Medium - High	Low-Medium	Medium-High	Low-Medium
Change in land capability	Medium - High	Medium	Low Medium	Low-Medium
Surface Water Pollution and Alteration of Natural Drainage Lines	High	Medium	Low-Medium	Low
Groundwater Pollution and Quantity	Medium - High	Low-Medium	Medium-High	Low-Medium
Terrestrial (Floral Damage and Alternation)	Medium	Low-Medium	Low	Low
Terrestrial (Faunal Displacement and Higher mortality rates)	Medium - High	Low-Medium	Medium	Low-Medium
Air Quality	Medium	Low-Medium	Medium	Low
Positive Economic Benefit	Medium	N/A	Medium	N/A
Altering of sense of place for local community	Medium	Low-Medium	Medium	Low-Medium
Rise in noise levels	Medium	Low-Medium	Medium	Low-Medium
Increase in traffic volumes and accident rates	Medium-High	Medium	Medium-High	Medium
Damage to heritage and archeological objects	Medium	Low	Medium-High	Medium
Damage to Paleontological artifacts	Low-Medium	Low	Low-Medium	Low

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
CLOSURE AND DECOMMISIONING PHASE				
Alteration of Natural Topography	Medium	Low	Medium	Low
Soil Erosion	Medium	Low	Medium	Low-Medium
Soil Contamination	Medium - High	Low-Medium	Medium-High	Low-Medium
Change in land capability	Medium - High	Medium	Low Medium	Low-Medium
Surface Water Pollution and Alteration of Natural Drainage Lines	High	Medium	Low-Medium	Low
Groundwater Pollution and Quantity	Low-Medium	Low	Low-Medium	Low
Terrestrial (Floral Damage and Alternation)	Medium	Low-Medium	Low	Low
Terrestrial (Faunal Displacement and Higher mortality rates)	Medium - High	Low-Medium	Medium	Low-Medium
Air Quality	Medium	Medium	Medium	Low-Medium
Positive Economic Benefit	Medium	N/A	Medium	N/A
Altering of sense of place for local community	Medium	Low-Medium	Medium	Low-Medium
Rise in noise levels	Medium	Low-Medium	Medium	Low-Medium
Increase in traffic volumes and accident rates	Medium-High	Medium	Medium-High	Medium

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
Damage to heritage and archeological objects	Medium	Low	Medium-High	Medium
Damage to Paleontological artifacts	Low-Medium	Low	Low-Medium	Low

CONCLUSION

Based on the outcome of the impact assessment rating system, it becomes evident that Alternative 2 (mine infrastructure on Portion 10 of the Farm Rietkuil 224 IS) has potentially lower environmental impacts. This is predominately due to the fact that the site is not located within close proximity of a wetland or sensitive habitat. In terms of the heritage and archaeological findings, the alternative is however considered sensitive due to a settlement foundation that might be associated with the nearby identified graveyard (in close proximity of the mining footprint on the same property). This alternative (Alternative 2) is however deemed to be problematic from a socio-economic perspective, as the landowner (Mr Uys) has objected to the project due to economic factors including active farming practices and lease agreement agreed upon for the next 7 years.

Alternative 1 (Preferred site located on Portion 5 of the Farm Kalabasfontein 232 IS) infringes on a wetland buffer and is also associated with the crossing of hillslope seepage area. There is however an existing gravel road (used by the existing farming community) crossing this portion of the hillslope seepage which can be used and upgraded by ecological sensitive civil designs which enhances the current water flow capabilities. The wetland and surface water studies have delineated the wetland and imposed a 100m around the wetland area. It is therefore recommended that a third alternative (Alternative 3) is considered whereby the mining footprint and layout is moved further to the west of the wetland area so as to be completely out of the buffer zone of the wetland and associated riparian zone.

CONTENTS

No table of contents entries found.

List of Tables

List of Figures

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).
Environmental Management Plan	An Environmental Management Plan (EMP) can be defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".
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
CBA:	Critical Biodiversity Area
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
ESA:	Ecological Support Area
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 (as amended) as associated Regulations
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 and associated Regulations
NC:	Non-conformance
NHRA:	National Heritage Resources Act, 25 of 1999
NWA:	National Water Act, 36 of 1998
PAIA:	Promotion of Access to Information Act, Act 2 of 2000
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

ENVIRONMENTAL IMPACT 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:	**DIEPSOILS INVESTMENTS (Pty) Ltd**
TEL NO:	083 476 1247
FAX NO:	086 696 4891
POSTAL ADDRESS:	PO Box 1677, Ferndale, 2160
PHYSICAL ADDRESS:	Unit 15, Concept House A, 10 Pony Street, Silver lakes, Pretoria

FILE REFERENCE NUMBER SAMRAD: MP 30/5/1/2/2/10187 MR

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 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

a. determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

b. describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

c. identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

d. determine the—-

nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

degree to which these impacts—

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

e. identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

f. identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

g. identify suitable measures to manage, avoid or mitigate identified impacts; and

h. identify residual risks that need to be managed and monitored.

PART A: SCOPE OF ASSSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of

i. Details of the EAP

Name of The Practitioner: Mr. Vernon Siemelink
Tel No.: 012 807 0383
Fax No. : 086 714 5397
e-mail address: vernon@ecoelementum.co.za

Expertise of the EAP.

1. **The qualifications of the EAP**

(With evidence attached as **Appendix 1**).

Table 2: Qualifications of the EAP

Name	**Vernon**
Surname	Siemelink
Company	Eco Elementum (Pty) Ltd
Position	Director – Senior Environmental Consultant
Location	The Willows Office Park, Die Wilgers, Pretoria
Email	vernon@ecoelementum.co.za
Telephone Number	072 196 9928/ 012 348 5214
Education	**MA(EnvMan) - Masters in Environmental Management** Master's Degree at University of Pretoria in Pretoria, South Africa (Mpumalanga) **BSSc. GeoScience - Honours in Geographical Science** Honours Degree at University of Pretoria in Pretoria, South Africa (Mpumalanga)
Professional skills	- Vernon Siemelink is a Director at Eco Elementum (Pty) Ltd Environmental and Project Management Professionals and has been involved in the field of environmental science and environmental management for the past 9 years. - Vernon is a SGS IRCA Certified EMS Lead Auditor and a SETA accredited assessor. He has also completed the CEM auditor conversion training for ISO 9001, ISO 14001 and OHSAS 18001 Integrated Management Systems. - Vernon Siemelink has been an environmental consultant and professional since 2008, specialising in the fields of: • Environmental Impact Assessments and Authorisations; • Water use license application • Waste use license application • Environmental Monitoring and Control; • Mine Closure and Rehabilitation; • Environmental Compliance and Audits; • Environmental Management Systems; and Specialist Impact Studies - During this time, he has provided quality, environmental, and health and safety consulting and auditing services in nearly every industry sector. - Furthermore, Vernon holds a Master's Degree in Environmental Management and an Honours Degree in Geosciences from the University of Pretoria.

2. **Summary of the EAP's past experience.**

(In carrying out the Environmental Impact Assessment Procedure attached as **Appendix 2**)

Table 3: Summary of EAP Experience

Skills	- Environmental Impact Assessments - Basic assessments, WULA reports - Water use license application - Waste use license application - Prospecting and Mining Right Authorizations - Environmental Management Plans - Public Participation - Environmental Authorizations - ISO 14001:2004 Environmental Management System Auditor - FSC Forest Management Auditing - Geographic Information System Support (ArcGISv9.2) - SETA Accredited Assessor - EMSware software Administrator - Integrated Management System Auditor
EAP Experience	- Vernon is an ISO 14001 Lead Auditor and environmental professional with over 11 years' experience in the environmental industry. Vernon holds a Master's Degree in Environmental Management and an Honours Degree in Geosciences from the University of Pretoria. Work experience ranges from Environmental Auditing, Due Diligences, Technical Legal opinions, Impact Assessments, Stakeholder Engagement and technical specialist in the mining and manufacturing sectors. - Vernon has also provided quality, environmental, and health and safety consulting and auditing services in nearly every industry sector. Vernon is a SGS IRCA Certified EMS Lead Auditor and a SETA accredited assessor. He completed the CEM auditor conversion training for ISO 9001, ISO 14001 and OHSAS 18001 Integrated Management Systems

b) Description of the property

Table 4: Location of the property

Farm Name:	Remaining Extent and Portions 1,3,4,5,6,7,8,9,10,11 & 12 of the Farm Rietkuil 224 IS, Portions 1,2,4,6,8,9,10,11 & RE of the Farm Vaalbank 233 IS; and Portion 5 of the Farm Kalabasfontein 232 IS
Application area (Ha)	5,626 hectares
Magisterial district:	Magisterial District of Bethal, Msukaligwa Local Municipality, Gert Sibande District Municipality in Mpumalanga
Distance and direction from nearest town:	Located approximately 15 km northeast of Bethal, and can be accessed via R38 from Bethal and turning east into the project area
21 digit Surveyor General Code for each farm portion:	KALABASFONTEIN 232 IS PTN 5 - T0IS00000000023200005 VAALBANK 233 IS PTN 6 - T0IS00000000023300006 VAALBANK 233 IS PTN 1 - T0IS00000000023300001 VAALBANK 233 IS PTN 2- T0IS00000000023300002 VAALBANK 233 IS PTN 4 - T0IS00000000023300004 VAALBANK 233 IS PTN 9 - T0IS00000000023300009 VAALBANK 233 IS PTN 10 - T0IS00000000023300010 VAALBANK 233 IS PTN 11- T0IS00000000023300011

	RIETKUIL 224 IS PTN RE - T0IS00000000022400000 RIETKUIL 224 IS PTN 1 - T0IS00000000022400001 RIETKUIL 224 IS PTN 3- T0IS00000000022400003 RIETKUIL 224 IS PTN 4 - T0IS00000000022400004 RIETKUIL 224 IS PTN 5- T0IS00000000022400005 RIETKUIL 224 IS PTN 6 - T0IS00000000022400006 RIETKUIL 224 IS PTN 7 - T0IS00000000022400007 RIETKUIL 224 IS PTN 8- T0IS00000000022400008 RIETKUIL 224 IS PTN 9- T0IS00000000022400009 RIETKUIL 224 IS PTN 10 - T0IS00000000022400010 RIETKUIL 224 IS PTN 11 - T0IS00000000022400011 RIETKUIL 224 IS PTN 12 -T0IS00000000022400012

c) Locality Map

(Nearest town, scale not smaller than 1:250000 attached as Appendix 3)

The proposed Mining Right area comprises over 5,626 hectares in extent, is located approximately 15 km northeast of Bethal. The site can be accessed via R38 from Bethal by turning east into the project area. The site falls within the boundaries of the Msukaligwa Local Municipality in the Gert Sibande District Municipality of Mpumalanga (Figure 3).

The area is located in the Ermelo Coalfield. The Ermelo Coalfield is situated in south east Mpumalanga Province between Carolina in the north and Dirkiesdorp in the south, Morgenzon in the west and Amsterdam in the east. The northern and eastern boundaries are defined by the sub-outcrop of the coal-bearing strata against pre-Karoo rocks. The western and southern boundaries are rather arbitrarily defined as straight lines forming the western boundary with the Highveld Coalfield and the southern boundary with the Coalfields of KwaZulu-Natal.

Figure 3: Gert Sibande District Municipality

d) Description Of The Scope Of The Proposed Overall Activity

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

- Proposed Infrastructure for Diep Vaalbank Coal Mine include:
    - Main access road, service roads and general internal roads;
    - Contractor's Yard with septic/chemical ablution facilities;
    - Access control, security housing and weighbridge
    - Offices, parking bays, control room, lamp room, ablution and change house
    - Weighbridge, workshop and stores (with septic/chemical ablution facilities);
    - Workshops, stores, wash bay and yard
    - Explosive bunker and storage area
    - Rail Siding;
    - Diesel facilities and a hardstand;
    - Decline shaft to Mineral Reserve (Coal);
    - Vertical shafts for ventilation and access to rescue bays
    - Conveyor belt system;
    - Power and Water;
    - Ventilation shafts;
    - Boxcut of the declined shaft.
    - Haul roads;
    - Overburden stockpile from decline shaft excavation
    - Topsoil stockpiles and stormwater berms
    - Crushing, Screening and Washing Plant;
    - Storm water management infrastructure inclusive of pollution control dam
    - Underground water supply pipelines
    - Septic tank for sewage handling
    - Operational mining area fencing
    - General water management infrastructure;
        - Jojo tank for potable water
        - Tower tank for fire suppression
        - Steel surface level tank for process water
    - Sub-station and backup generators
    - Electricity supply powerlines
    - Bunded fuel storage facility and re-fueling station
    - Temporary storage waste yard (general, scrap and hazardous waste)

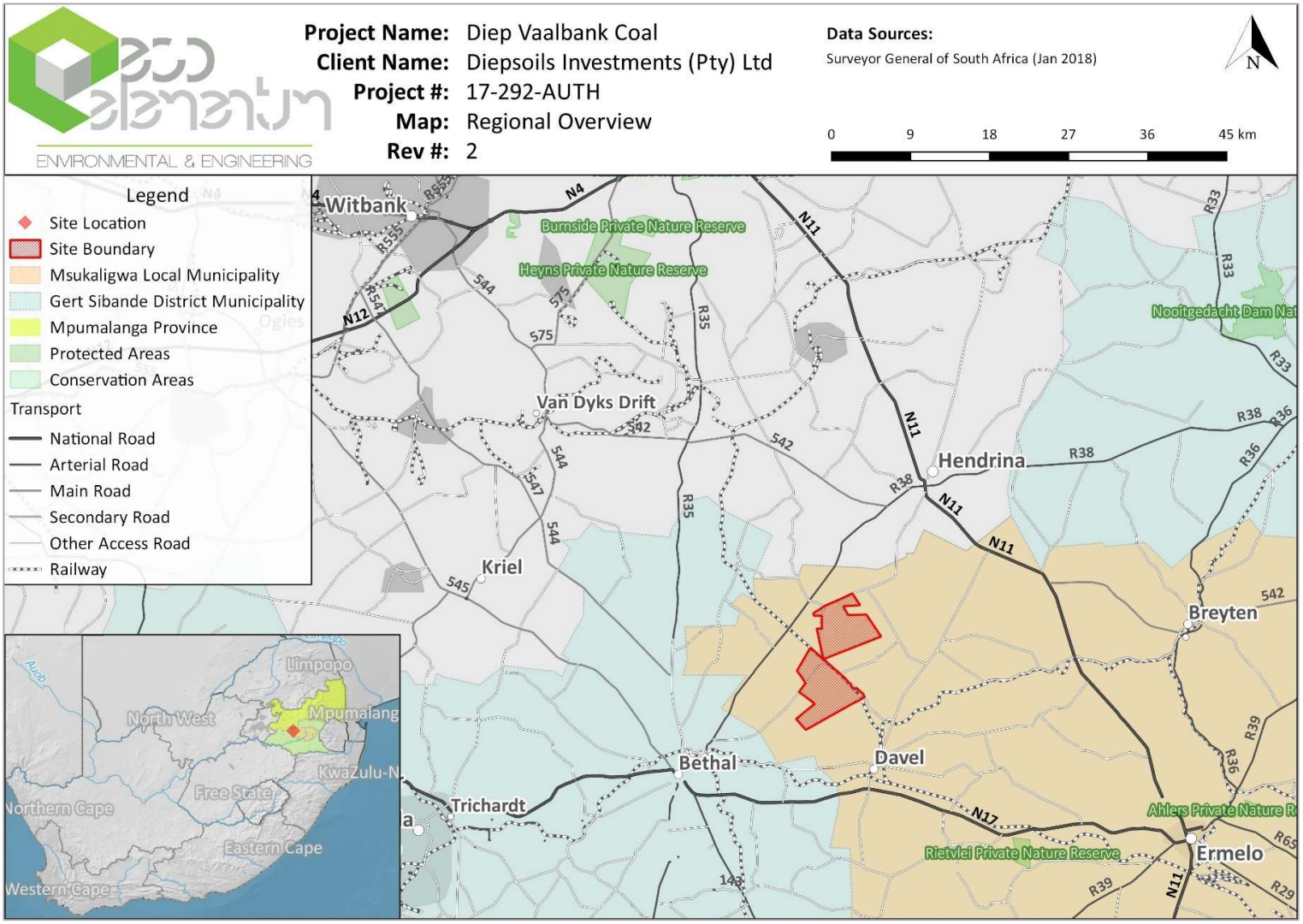


Figure 4: Regional Overview Map

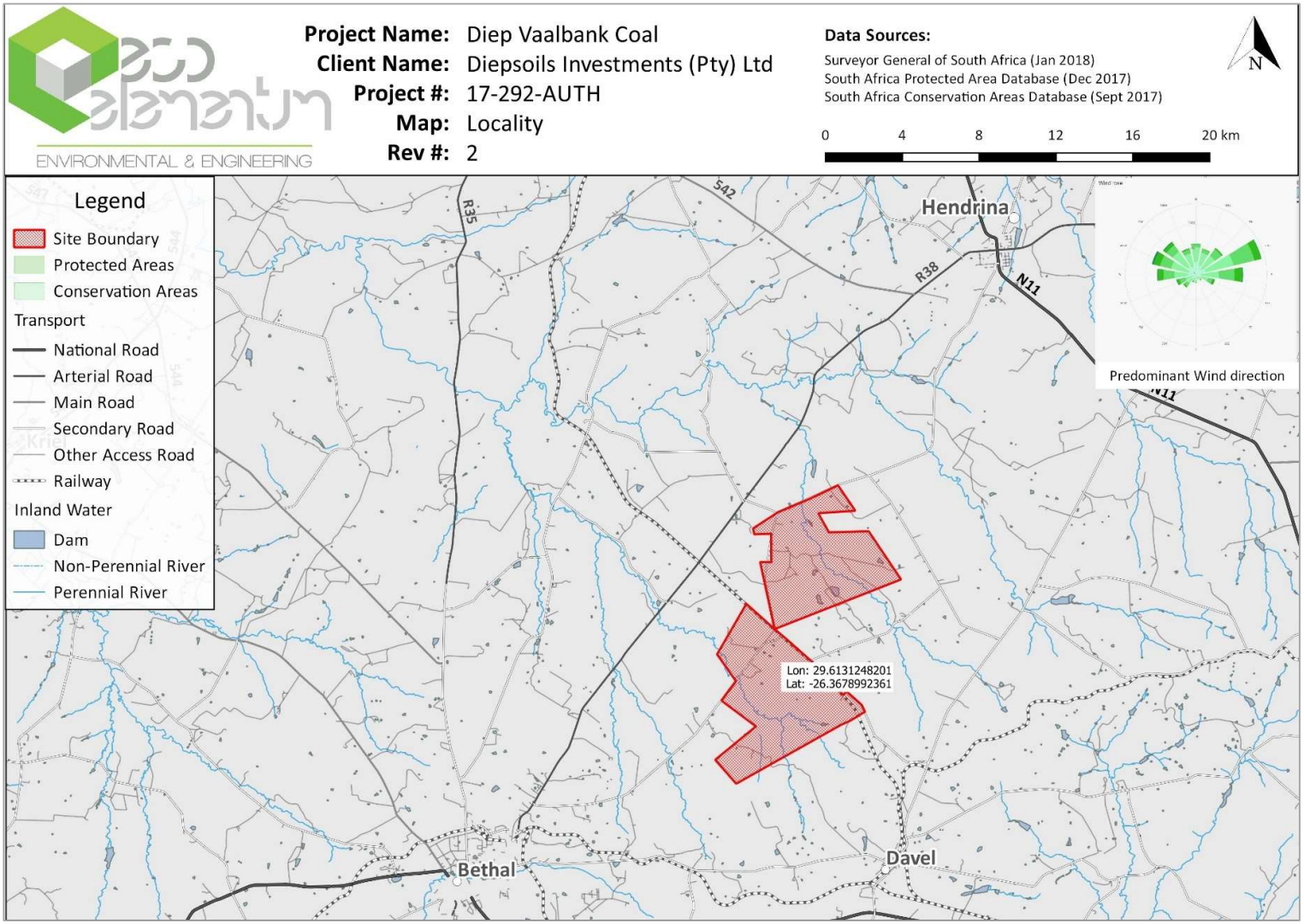


Figure 5: Locality Map

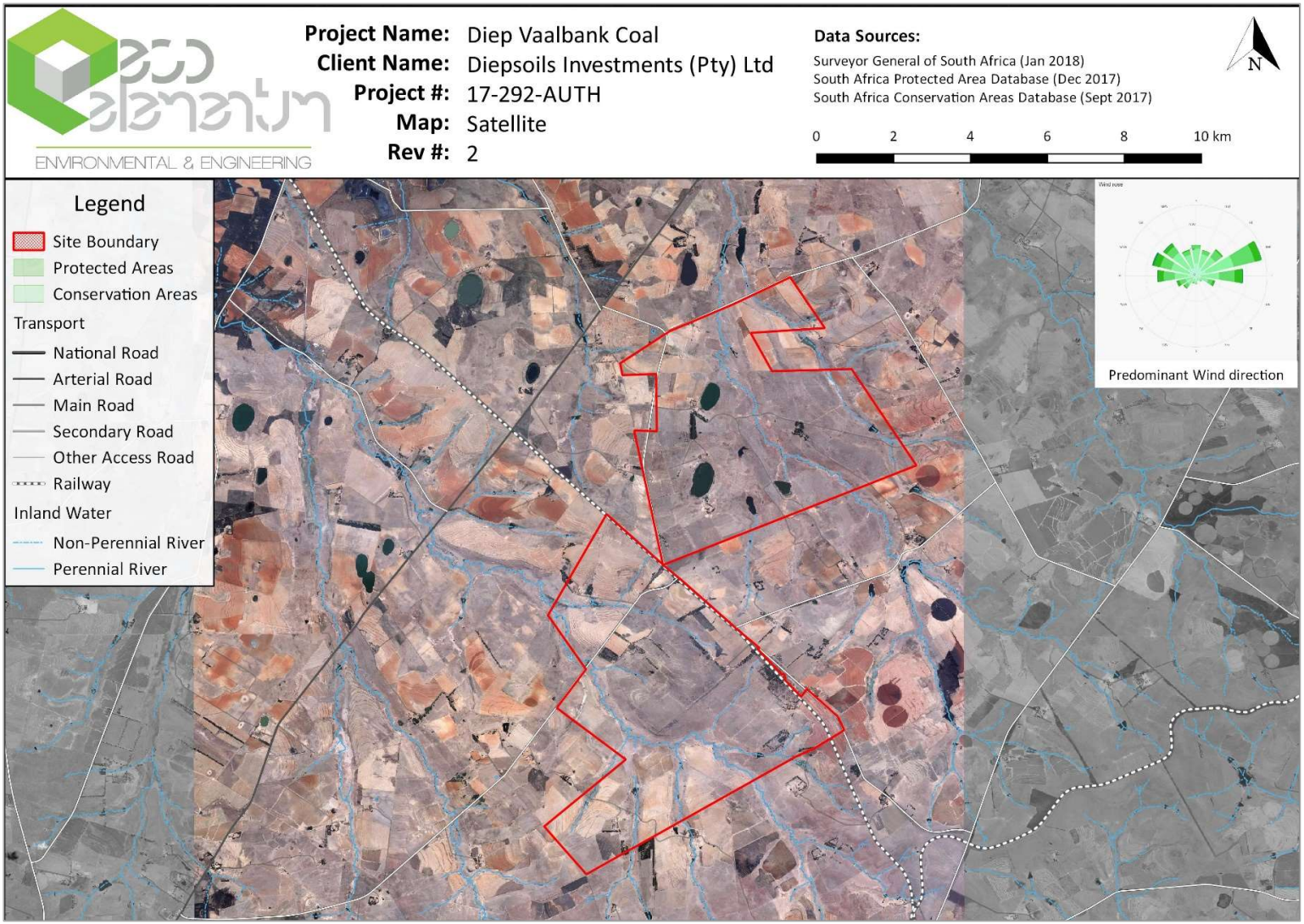


Figure 6: Locality Map with Satellite Imagery

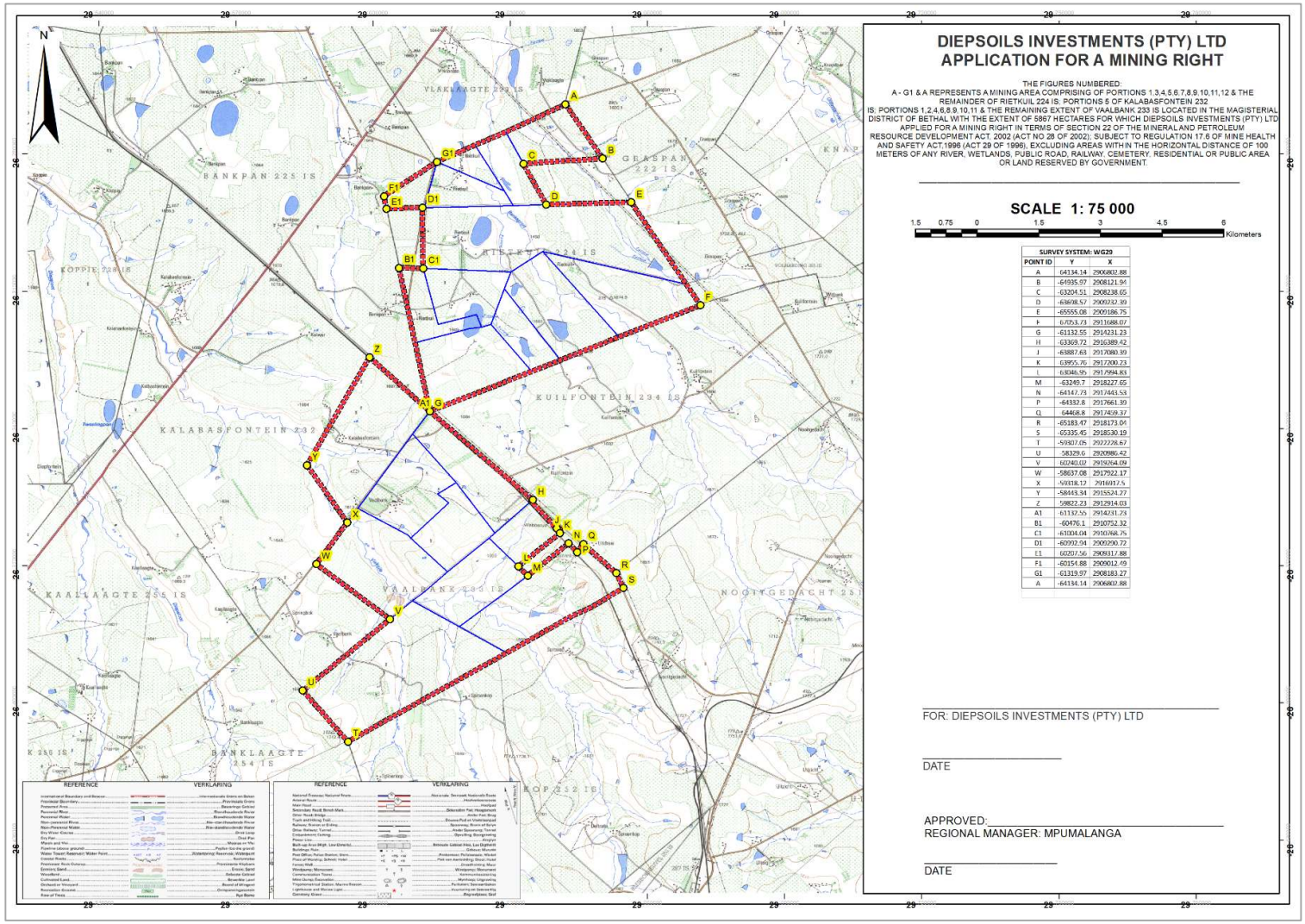


Figure 7: Regulation 2(2) Map

Figure 8: Site Layout and Proposed Alternatives

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 37 of the MPRDA confirms that the principles set out in the NEMA apply to all prospecting and mining operations and must be carried out in accordance with the generally accepted principles of sustainable development 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 Government Notice (GN) 983, Listing Notice 2 GN 984 and Listing Notice GN 985 (dated 4 December 2014 and updated in 2017) of NEMA. The proposed mining activity triggers:

Table 5: Listed and Specified Activities

NAME OF ACTIVITY (All activities including activities not listed) **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**	**Aerial extent of the Activity** **Ha or m²**	**LISTED ACTIVITY** **Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE** **(GNR 544, GNR 545 or GNR 546)/NOT LISTED**	**WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)**
Any activity including the operation of that activity which requires a Mining right in terms of section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to mining of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	60 ha	X	GNR 983 – Listing Notice 1: Activity 11, 12, 13, 22, 24, 27, 30. GNR 984 – Listing Notice 2: Activity 6, 15, 17 & 21 GNR 985 – Listing Notice 3: 2, 4, 10, 12 & 14	Category A: Activity 14 Category B: Activity 7, 10 & 11
All infrastructure areas, development footprints and associated activities.	Mineral Boundary 5867 ha Approximate are of surface disturbance 25ha	X	GNR 983 – Listing Notice 1: Activity 11, 12, 13, 22, 24, 27, 30. GNR 984 – Listing Notice 2: Activity 6, 15, 17 & 21 GNR 985 – Listing Notice 3: 2, 4, 10, 12 & 14	Category A: Activity 14 Category B: Activity 7, 10 & 11
Boxcut excavation	3ha	X	GNR 984, listed activity 17	

Topsoil & subsoil stripping & stockpiling into berms	Maximum 25 ha area	X	GNR 983, listed activity 27 & 30 GNR 984, listed activity 15	
Overburden stockpiles (non-carbonaceous)	1.5ha	X		
Overburden stockpiles (carbonaceous)	1.5ha			Category B: Activity 7, 10, 11
Ventilation Shafts (2)	200m^2 each	X		
Underground Mining	Mineral boundary: 5867 ha	X	GNR 984, listed activity 17	
RoM coal stockpiling	ROM Feed:1.5 ha for 14 000 tons			
Coal product stockpile and loading area	Product coal: 1.9ha for 15000-20000 tons			
Access and hauling along roads	4500m x 13m	X	GNR 983, listed activity 24 GNR 985, Listed activity 4	
Processing Plant (crushing, screening and washing)	2ha	X	GNR 984, listed activity 21	
Coal testing laboratory	Within Crushing & Screening & Processing Plant area			
Water supply and storage (potable & process)	Process water: 1ha for 2300m3/day Potable water: <1ha for 40m3/day	X	GNR 983, listed activity 13 GNR 985, listed activity 2	
Integrated discard and slurry dump	10 ha	X		Category B: Activity 7, 10, 11
Storm water runoff management features	Dirty water trenches: 3000m	X		
Water & slurry pipelines	<1000m		GNR 983, listed activity 9 & 10	
Waste generation & storage	0.4 ha			Norms and Standards
Stores, workshops & wash bays	0.6ha			
Ablutions & change house with sewage treatment plants	0.6ha	X	GNR.983, listed activity 25	

Fuel storage	0.2ha		GNR.985, listed activity 10	
Administration area	2 ha	X		
Substation and power transmission	0.7ha and <1ha cumulative for pylons	X	GNR.983, listed activity 11	
Rehabilitation, including backfilling of boxcut audit	60ha	X	GNR.983, listed activity 22	Category A: Activity 14

Table 6: NEMA Listed Activities

Number and date of relevant notice	Activity No(s) (in terms of the relevant notice)	Description of each listed activity as per the government notice and the detailed project description
GNR 983- Listing Notice 1 **Listing Notice 1**	11	The development of— i. dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or ii. infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — **Project Relevance:** **Alternative 1: Mining infrastructure (specifically Portion 5 of the farm Kalabasfontein 232 and Portion 9 and 10 of the farm Rietkuil 224) will infringe on NFEPA wetlands which are associated with the Viskuile Spruit and the Vaalbank Spruit. These areas are included in the Upper-Olifants Catchment.**
	12	The development of canals, channels, dams, and bulk stormwater outlet structures, buildings, and infrastructure exceeding 100 square metres in size, were such development occurs within a watercourse. **Project Relevance:** **Alternative 1: Mining infrastructure (specifically Portion 5 of the farm Kalabasfontein 232 and Portion 9 and 10 of the farm Rietkuil 224) will infringe on NFEPA wetlands which are associated with the Viskuile Spruit and the Vaalbank Spruit. These areas are included in the Upper-Olifants Catchment.**
	13	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014. **Project Relevance:** **Water from the underground will be stored in underground dams, as well as within a surface dam / sump for use within the process.**

		The storage of process water (1ha for 2300m3) **Storage of Potable water: <1ha for 40m3/day**
Listing Notice 1	24	The development of a road- for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or with a reserve wider than 13.5m or where no reserve exits where the road is wider than 8m but excluding a road which is identified and included in Activity 27 in Listing Notice 2 of 2014 or roads where the entire road falls within an urban area or which is 1km or shorter ***Project Relevance:*** ***Building of access and haul roads (4.5km with 13m road reserve)***
	30	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). **Project Relevance:** **The site is moderately to heavily modified but both aquatic and terrestrial CBA and ESA occur on the farms.**
GNR 984- Listing Notice 2	6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding— (i) activities which are identified and included in Listing Notice 1 of 2014; **(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (ActNo. 59 of 2008) in which case the National Environmental Management: Waste Act,2008 applies;** (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day. **Project Relevance:** **Triggering of Category B: Activity 7, 10, 11 included in the list of waste management activities published in terms of section 19 due to:** • **Overburden stockpiles (non-carbonaceous) of 1.5ha** • **Overburden stockpiles (carbonaceous) of 1.5ha** • **Integrated discard and slurry dump of 30 ha** • **RoM coal stockpiling of 1.5ha** **Triggering of Category, A: Activity 14** **Rehabilitation, including backfilling of boxcut audit.**
	15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—

		(i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. **Project Relevance:** **The project footprint is estimated at 60ha (of 5867ha of the mining boundary area) which include:** • **Topsoil & subsoil stripping & stockpiling into berms** • **All infrastructure areas, development footprints and associated activities.**
Listing Notice 2	17	Any activity including the operation of that activity which requires a mining right as contemplated in section 22 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 this Notice applies. **Project Relevance:** **A Mining Right has been applied for as part of per the legal requirements.**
	21	Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies. **Project Relevance:** **The mining operation entails the extraction of underground coal including crushing, screening and washing**

GNR 985- Listing Notice 3	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. **Mpumalanga** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas; (bb) National Protected Area Expansion Strategy Focus areas; **(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;** (dd) Sites or areas identified in terms of an international convention; **(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;** (ff) Core areas in biosphere reserves; or (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding **Project Relevance:** **The site is moderately to heavily modified but both aquatic and terrestrial CBA and ESA occur on the farms**
	10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. **Mpumalanga** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; **(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;** (dd) Sites or areas identified in terms of an international convention; **(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans**; (ff) Core areas in biosphere reserves; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, where such areas comprise indigenous vegetation; or **hh) Areas within a watercourse or wetland, or within 100 metres of a watercourse or wetland** **Project Relevance:** **Fuel will be stored on site. Aquatic and terrestrial CBA and ESA occur on the farms**

	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. **f. Mpumalanga** **i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;** **ii. Within critical biodiversity areas identified in bioregional plans; or** iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA. **Project Relevance:** **Due to the associated aquatic and terrestrial CBA and ESA areas on site, this activity could be relevant**
	14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, Measured from the edge of a watercourse; **f. Mpumalanga** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas identified in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation;

		Project Relevance: **Due to the associated aquatic and terrestrial CBA and ESA areas on site, this activity could be relevant**

- Description of the activities to be undertaken

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

  - Mineral: Coal
  - Mining Method: Underground board-&-pillar
  - Depth of mining: Average depth between 40m - 146m below surface
  - Air vents: Two ventilation shafts required
  - Life of Mine: +20 years
  - Product Market: Sudor Coal & Eskom

  The potential of open cast mining (truck and shovel strip mining) was discarded due to the fact that the strip ratio is significantly higher than the strip ratios from the breakeven strip ratio analysis.

- Process

  The underground will be accessed via a decline shaft. It is proposed that the decline shaft, plant and associated mine infrastructure be located on Portion 5 of the farm Kalabasfontein IS. Coal will be transferred from the underground to surface by means of a conveyor belt. Whereby, it will be sent to the plant area for processing (crushing, screening and washing). Mine residue from the plant will be disposed of onto an integrated disposal dump. Product coal will be sized and stockpiled in designated areas for pre-qualification prior to being trucked to market. It is currently anticipated that the plant will run 24/7.

  Once the mining operation is completed, the decline shaft will be sealed off and backfilled with spoil material. When levelled to the required height, topsoil will be deposited and vegetation established. All rehabilitation will be done as per the Environmental Management Plan requirements (EMP).

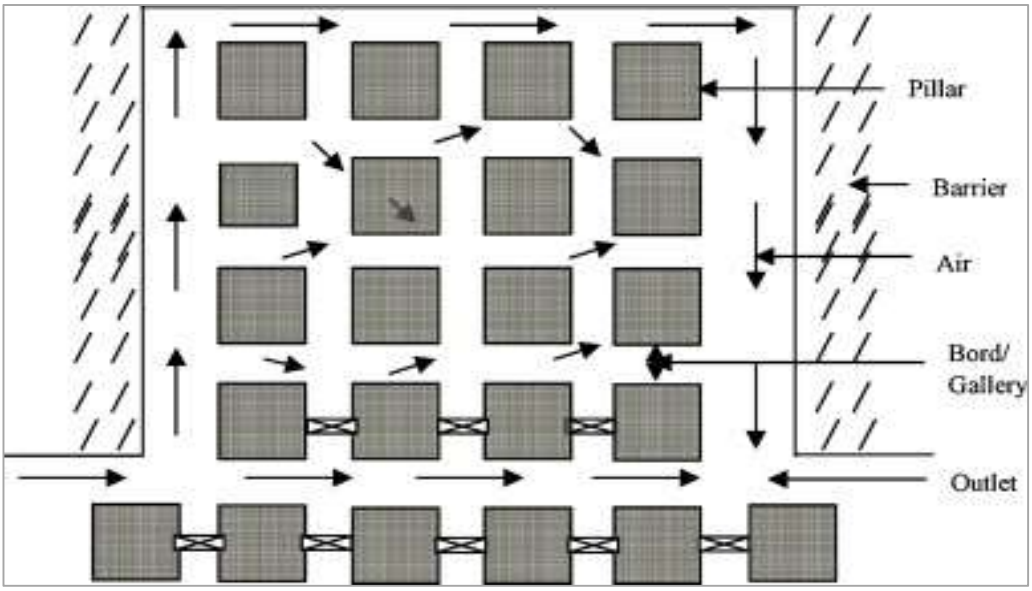


Figure 9: Underground board-&-pillar method Illustration

- Proposed Infrastructure
    - Main access road, service roads and general internal roads;
    - Contractor's Yard with septic/chemical ablution facilities;
    - Access control, security housing and weighbridge
    - Offices, parking bays, control room, lamp room, ablution and change house
    - Weighbridge, workshop and stores (with septic/chemical ablution facilities);
    - Workshops, stores, wash bay and yard
    - Explosive bunker and storage area
    - Rail Siding;
    - Diesel facilities and a hardstand;
    - Decline shaft to Mineral Reserve (Coal);
    - Vertical shafts for ventilation and access to rescue bays
    - Conveyor belt system;
    - Power and Water;
    - Ventilation shafts;
    - Boxcut of the declined shaft.
    - Haul roads;
    - Overburden stockpile from decline shaft excavation
    - Topsoil stockpiles and stormwater berms
    - Crushing, Screening and Washing Plant;
    - Storm water management infrastructure inclusive of pollution control dam
    - Underground water supply pipelines
    - Septic tank for sewage handling
    - Operational mining area fencing
    - General water management infrastructure;
        - Jojo tank for potable water
        - Tower tank for fire suppression
        - Steel surface level tank for process water
    - Sub-station and backup generators
    - Electricity supply powerlines
    - Bunded fuel storage facility and re-fueling station
    - Temporary storage waste yard (general, scrap and hazardous waste)

Figure 10: Preferred Alternative Site Layout (Kalabasfontein)

Figure 11: Alternative 2 (Rietkuil Farm)

Figure 12: Preferred Alternative 1 Infrastructure Map (Kalabasfontein)

Figure 13: Alternative 2 Infrastructure Map (Rietkuil)

e) Policy and Legislative Context

Table 7: Policy and Legislative Context

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 (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT **(E.g. In terms of the National Water Act-Water Use License has/has not been applied for).**
NATIONAL LEVEL		
The South African Constitution In terms of Section 24, of the Constitution of the Republic of South Africa (108 of 1996), everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while prompting justifiable economic and social development.	Applied at potential impacts identification as well as mitigation measures and public participation. The project must be proven to be sustainable and balance the social, economic and environmental aspects of sustainable development	An open and participatory public participation process will be followed. An EMP and awareness plan will be designed according to the issues raised during this process.
Promotion of Access to Information Act, 2000 **(Act No. 2 of 2000) (PAIA)** PAIA recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right	The S&EIR process is aligned with the PAIA and therefore fair and open public participation is undertaken.	NEMA Public Participation Process will be followed as per the 2014 EIA Guidelines (Chapter 6).
National Environmental Management Act (107 of 1998) The NEMA provides the overarching legislation for environmental governance in South Africa, giving effect to Section 24 of the Constitution of the Republic of South Africa. NEMA sets out the fundamental principles of Integrated Environmental Management that must be adhered to in order to ensure sustainable development.	Section 28 of the NEMA includes a far-reaching general "Duty of Care" which stipulates the need to protect the environment from degradation and pollution.	An Application for Environmental Authorisation and Mining Right has been made to the DMR (06/11/2017) A water use license application is also underway for all activities under Section 21 of the National Water Act requiring a Water Use License

	In terms of the listed activities, a S&EIR process is required. Proposed management and mitigation measures for identified impacts responds to the Duty of Care principle According the Chapter 1, NEMA Principles Section 4(f) the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured	Various State Departments (including Eskom, DWS, DARDLEA, Transnet, DAFF, local and district municipality etc), NGOs, landowner and adjacent landowners and Environmental Agencies have been notified of the proposed mining right and comments have been sought from them in this regard.
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) To make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith.	**Section 22-** The project requires a mining right authorisation from the DMR.	• A section 22 Mining Right Application was lodged with the DMR on 06 November 2017. • MPRDA requires mining companies to develop and implement a Social and Labour Plan (SLP)
NEMA Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) GNR 983 - Activities 11,12,13,22,24,27&30; GNR 984 - Activities 6,15,17&21; and GNR 985 - Activities 2,4,10,12&14	In terms of the listed activities, a S&EIR process is required. The process will be followed in terms of the "one environmental system".	An Application for Environmental Authorisation and Mining Right has been made to the on 06 November 2017. The various legislative reports (scoping, EIA and EMP) includes an assessment of the impacts associated with the listed activities.
National Water Act (Act No. 36 of 1998) The NWA is the primary regulatory legislation, controlling and managing the use of water resources as well as the pollution thereof. This act provides for fundamental reformation of legislation relating to water resource use.	An IWULA will be submitted to DWS for the applicable Section 21 water uses including: (a) abstraction from a borehole (c) and (i) mining activities within 500m from a wetland	The DWS will provide comment and an application will be lodged for their review prior to the undertaking of any water use activities on site Management Principles will be applied to the mining operations as per GN704

GN 704- Regulations on use of water for mining and related activities aimed at the protection of water resources	(g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams; and (j) dewatering of underground workings	
National Environmental Management: Waste Act The objectives of NEM:WA involve the protection of health, wellbeing and the environment by providing reasonable measures for the minimization of natural resource consumption, avoiding and minimizing the generation of waste, reducing, recycling and recovering waste, and treating and safely disposal of waste as a last resort. In terms of the NEMWA, all waste management activities must be licensed A distinction is made between: • Category A waste management activities, which require a basic assessment, • Category B activities, which require a full EIA, and • Category C waste management activities which do not require a waste management licence but compliance with relevant norms and standards According to Section 44 of the Act, the licensing procedure must be integrated with an EIA process in accordance with the Regulations GNR 982.	In terms of the list of Section 19 waste management activities, a S&EIR process is required. The process is part of the "one environmental system" GNR 633 includes the establishment or reclamation of a residue stockpile or residue deposit resulting from prospecting or mining activities as a listed activity	In terms of GN718 of 2009, under NEMWA, various Category A and B waste management activities are applicable to the proposed mining operation. The impacts and associated management and/or mitigation measures will be included in the EIA phase of the project.
National Heritage Resources Act (Act No. 25 of 1999) The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA).	An Heritage and Paleontological study has been initiated to identify and assess the project in terms of heritage and paleontological resources. This is mandatory in terms of Section 38 of the NHRA	The Heritage Report will be uploaded on the SAHRIS website for comment and the development guided by any findings of the Report.
Conservation of Agricultural Resources Act (act no. 43 of 1983) (CARA) CARA provides for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.	Principles of the Act to be included in the relevant specialist's Scope of Work.	Mine Closure and Rehabilitation strategy to be informed by CARA and stakeholder engagement process.

Conservation of Agricultural Resources (Act 43 of 1983) Requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.	Principles of the Act to be included in the relevant specialist's Scope of Work.	Mitigation and Management measures to take cognizance of the Act's principles
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004); and applicable Regulations, Standards and Notices published in terms of NEMAQA The promulgation of this Act marked a turning point in the approach to air pollution control and governance in South Africa, introducing the philosophy of Air Quality Management, in line with international policy developments and the environmental right, i.e. Section 24 of the Constitution (Act No. 108 of 1996). The South African Bureau of Standards (SABS), in collaboration with DEA, established ambient air quality standards for gravimetric dust fallout namely South African National Standard – Sans1929:2011	Dust monitoring to be undertaken on site during operations	As part of the EMP dust suppression methods will be used.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996); The Mine Health and Safety Act (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa	Health and Safety Policy of mine to be guided by this Act	Risk Impact Assessment to be conducted
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
New Growth Path (NGP) 2010 The policy's principal target is to create five million jobs over the next 10 years (by 2020). This framework reflects government's commitment to prioritising employment creation in all economic policies. It identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda.	Key objectives and plans to be compared to project proposal	Used to assess the need and desirability

Municipal Systems Act, 2000 (Act No. 32 of 2000) Requires municipalities have to undertake an Integrated Development Plan (IDP) process to produce IDPs. An IDP is a legislative requirement and has a legal status and supersedes all other plans that guide development at local government level. In terms of Section 26 (e) of the Act, every municipality is also required to formulate a Spatial Development Framework (SDF) as a part of its IDP.	The project must be tested against the local and district IDP and SDF.	Used to assess the need and desirability
National Herbarium Pretoria **(PRE) Computerised Information System) PRECIS List** South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. This scientific system is designed to measure species' risk of extinction. The purpose of this system is to highlight those species that are most urgently in need of conservation action	Represent records of all species recorded by members of SANBI, researchers, farmers or the public and submitted to SANBI for identification	Consulted as part of the various specialist studies
IMPORTANT GUIDELINE DOCUMENTS/POLICIES		
• International Association for Impact Assessment Publications, International Principles for Social Impact Assessment (Vanclay, 2003); • Public Participation Guideline: Government Notice Number 807, published on 10 October 2012, • DEAT (2006) Guideline 3: General Guideline to the EIA Regulations, Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria • DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria	Guidance on the undertaking of Public Participation and the Social Impact Assessment Process	Principles followed during the EIA process and the public participation process.
PROVINCIAL LEVEL		
Mpumalanga Province's Provincial Spatial Economic Development Strategy (PSEDS) 2010 Nationally, the PSEDS is aimed at transforming the structure of the economy and narrowing and eventually eliminating the gap between the first and second economies. The primary objective of the MEGDP is to	Used to identify the provinces plan towards economic growth	To be assessed and investigated as part of the Need and Desirability of project proposal

foster economic growth that creates jobs, reduce poverty and inequality in the Province		
Gert Sibande Spatial Development Framework (SDF) 2016 The aim of the Spatial Development Framework is to give direction to development and take into account the need for and compatibility of the main land uses. The purpose of the Spatial Development Framework as a land use management tool is to plan, direct and control development but it does not provide land use rights.	Used to identify the municipality's long term spatial development plans. SDF to be considered in terms of the need and desirability	The SDF will be consulted as part of the Socio-Economic Study's Scope of Work and assessed in terms of need and desirability.
Gert Sibande Spatial Development Framework Integrated Development Plan (IDP) 2017-2022 The Integrated development planning process signifies the driving force for making municipalities more strategic, inclusive, responsive and performance-driven in character. The document contains the strategic development plan for a five-year cycle	Used to identify the municipality's strategic development plan. IDP is to be considered in terms of the need and desirability	The IDP will be consulted as part of the Socio-Economic Study's Scope of Work and assessed in terms of need and desirability
Mpumalanga Biodiversity Sector Plan (MBSP) 2014 The key output of a systematic biodiversity plan is a map of biodiversity priority areas (i.e. the CBA map). The CBA map delineates *Critical Biodiversity Areas* (CBAs), *Ecological Support Areas* (ESAs), *Other Natural Areas* (ONAs), *Protected Areas* (PAs), and areas that have been irreversibly modified from their natural state. The CBA Maps are at a fine-scale map (1:10 000 - 1:25 000) and aim to guide sustainable development by providing maps of biodiversity priority areas that can be used by planners and decision-makers in a range of sectors.	Used to identify sensitive areas on a spatial scale and serves as a guiding tool for the various specialist studies	Consulted as part of the various specialist studies.
LOCAL LEVEL		
Msukaligwe Local Municipality IDP (Integrated Development Plan) 2017-2022 The Local Government: Municipal Systems Act, Act 32 of 2000 requires that every Municipality must compile an Integrated Development Plan, implement the IDP, monitor and evaluate its performance and review such IDP annually.	Used to identify project Need and Desirability and evaluate the project in terms of regional and local planning frameworks.	IDP principles forms part of the socio-economic Scope of Work.

f) Specialist Investigations

The following specialist studies has been undertaken as part of the EIA process

Table 8: List of Specialists

Specialist Study	Appointed Specialist	Company
Socio-Economic Impact Study	Jessica de Beer (Social Component) Derek Zimmerman (Economic Component)	Gibb (Pty) Ltd Derek Zimmerman
Air quality	Neel Breitenbach	Eco Elementum (Pty) Ltd
Traffic Management	Robert Ostrowski, Pr.Eng Michael Einkamerer, Pr.Eng	Nurizon Consulting Engineers
Storm Water Management Plan (Draft)	Robert Ostrowski, Pr.Eng Michael Einkamerer, Pr.Eng	Nurizon Consulting Engineers
Aquatic Ecology	JP Fourie EJ Nieman	M2 Environmental Connections (MENCO)
Visual Impact Assessment	Henno Engelbrecht	Eco Elementum (Pty) Ltd
Blasting and Vibration	Danie Zeeman	Blast Management & Consulting
Ecological	Annerie Dinkelmann	Eco Elementum (Pty) Ltd
Geo-hydrological	Morne Burger Dr. Altus Huisseman	Geo Pollution Technologies – Gauteng (Pty) Ltd
Surface water	JP Fourie EJ Nieman	M2 Environmental Connections (MENCO)
Wetland	JP Fourie EJ Nieman	M2 Environmental Connections (MENCO)
Heritage, Archaeological, and Paleo	Tobias Coetzee	Mr. Tobias Coetzee
Paleontological	Dr Heidi Fourie	Dr Heidi Fourie
Civil Engineering	Mr. John le Roux	Nurizon Consulting Engineers
Soils, land use and land capability	Mariné Pienaar P.S. Rossouw	Rossouw Associates

g) Legal Requirements

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

Mining Right (MPRDA & MPRD Regulations):

- Section 22: Environmental Authorisation (NEMA and EIA Regulations namely:
  - GNR 983 - Activities 11,12,13,22,24,27&30;
  - GNR 984 - Activities 6,15,17&21; and

- GNR 985 - Activities 2,4,10,12&14
- Waste License (NEMWA - GNR 921)
  - Category A - Activity 14 and Category B - Activity 7 &10 and
  - An Integrated Water Use License 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; and
  - (j) dewatering of underground workings.

- To this effect, an integrated environmental application process will be followed by means of S&EIR. The Draft Scoping Report (DSR) was made available for a 30-day public review period (09 November 2017 – 09 December 2017) at the Hendrina (44 Kerk Street, Hendrina, 1095, Tel: 013 293 0000) and Bethal Public Library (Danie Nortje Street, Bethal, Tel: 017 624 3029), on the website (http://ecoelementum.co.za/downloads/) and per CD (upon request). Interested and affected parties (I&APs) were invited to register and provide written comments. A public open day was held at the Bethal Public Library on 1 December 2017 between 10:00-13:00.
- I&APs were referred to the relevant reference number(s),and was asked to 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 by 09 December 2017.

  - SEIR Process
    S&EIR process typically has four phases as illustrated by the figure below.

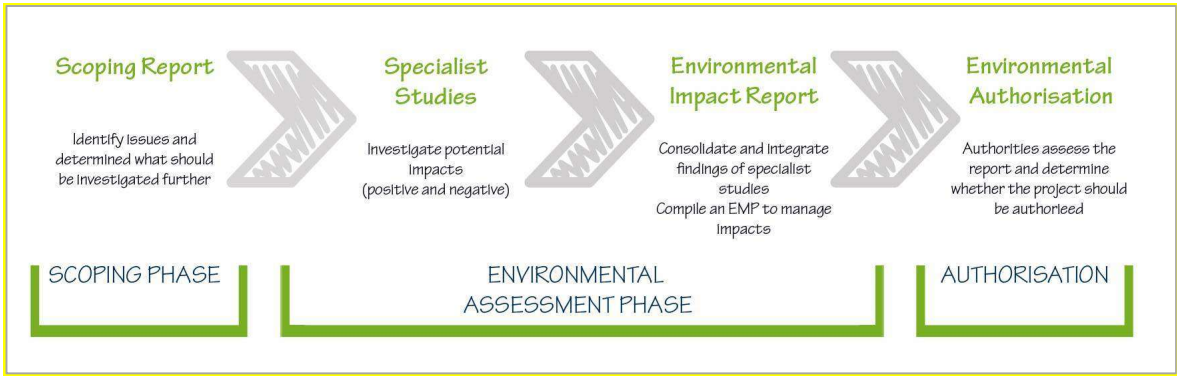


Figure 14: S&EIR flow diagram

h) Need and desirability of the proposed activities.

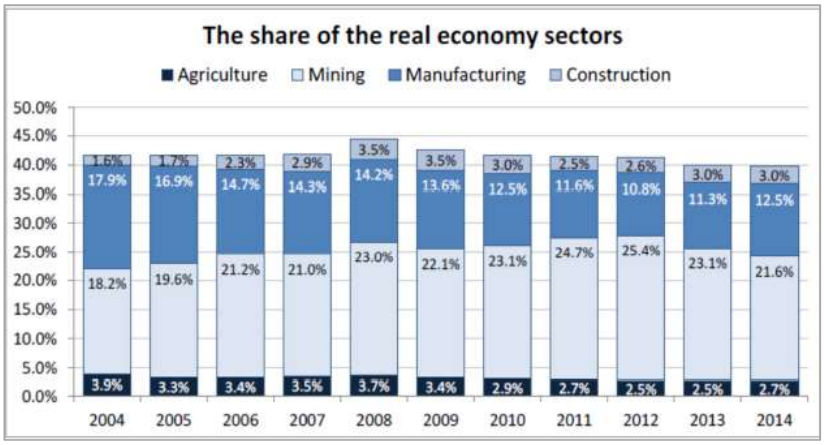
(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

- The mining 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,2018). 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.
- The mining sector contributes significantly to the GDP (22% of the provincial economy) followed by manufacturing at 12%, construction at 3%, and agriculture at 3% (see Table 9).

Table 9: Mpumalanga GVA – 2014



- The activity of mining has numerous social and economic benefits in local, regional and national context. These include: 1. Job creation 2. Skills development 3. SMME development 4. Local economic development 5. Contribution to local and national tax income (royalties, companies tax etc.) 6. Contribution to the national gross domestic product, and 7. Future business opportunities. The production of goods, supply of services or construction of infrastructure results in expenditure within a regional economy which has knock-on effects and results in additional expenditure which contributes to the regional economy
- The mining sector within Gert Sibande District has declined from 36.1% in 1996 to 23.9% in 2012 while the mining sector has increased significantly in Nkangala from 49.1% in 1996 to 69.4% in 2012. The project could this lead to the stimulation of the mining sector on a local and provincial level and create a range of opportunities for supplier development, Broad-Based Black Economic Empowerment (B-BBEE) and LED
- In terms of the Gert Sibande's IDP (2017-2022), the following objectives have been identified as part of the Key Performance Area (KPA) No. 6 which addresses the Spatial Development Analyses and Rationale through the vehicle of the GSDM Strategic Development Framework:
  - Promote intensive and extensive commercial farming activities throughout the District and facilitate Agrarian Transformation within the CRDP priority areas.
  - **Facilitate and accommodate mining in the District in a sustainable manner in order to support local electricity generation and industrial development**.
  - Unlock the industrial development potential of existing towns through developing industry specific Special Economic Zones/Economic Clusters throughout the District, in line with the Mpumalanga SDF and the Mpumalanga Vision 2030 Strategy in accordance with the following sectors:
    - Agricultural Cluster
    - Forestry Cluster
    - Industrial Cluster
- The economy of Msukaligwa Municipality is predominantly based on coal mining, agriculture, forestry and timber processing. The municipality hosts Eskom's Camden power station which is fed by surrounding coal mines stretching

from Albert Luthuli Municipality and coal haulage is being transported by road from the different mines. Coal haulage/transportation is also contributing meaningfully in terms of employment and support of local businesses (Msukaligwa IDP 2017-2022)

- The project area is dominated by the Vryheid Formation which is known to host coal in the Karoo within the Ecca Group. The bigger portion of the project area is located within the Witbank Coal Field and a smaller part of project is within the Ermelo Coal Field. A number of projects are under development by junior mining companies. The current project list predicts the production of an additional 55 million tpa within the next four to five years. The implementation of these projects should lift the junior miner contribution to 71.6 million tonnes production per annum. If all these projects are completed a total of 10 million tonnes per annum could be exported (MWP, 2017).

i) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

i. Details of the development footprint alternatives considered.

Based on the outcome of the impact assessment rating system, it becomes evident that Alternative 2 (mine infrastructure on Portion 10 of the Farm Rietkuil 224 IS) has potentially lower environmental impacts. This is predominately due to the fact that the site is not located within close proximity of a wetland or sensitive habitat. In terms of the heritage and archaeological findings, the alternative is however considered sensitive due to a settlement foundation that might be associated with the nearby identified graveyard (in close proximity of the mining footprint on the same property). This alternative (Alternative 2) is however deemed to be problematic from a socio-economic perspective, as the landowner (Mr Uys) has objected to the project due to economic factors including active farming practices and lease agreement agreed upon for the next 7 years.

Alternative 1 (Preferred site located on Portion 5 of the Farm Kalabasfontein 232 IS) infringes on a wetland buffer and is also associated with the crossing of hillslope seepage area. There is however an existing gravel road (used by the existing farming community) crossing this portion of the hillslope seepage which can be used and upgraded by ecological sensitive civil designs which enhances the current water flow capabilities. The wetland and surface water studies have delineated the wetland and imposed a 100m around the wetland area. It is therefore recommended that a third alternative (Alternative 3) is considered whereby the mining footprint and layout is moved further to the west of the wetland area so as to be completely out of the buffer zone of the wetland and associated riparian zone

(a) the type of activity to be undertaken;

Underground coal mining

(b) the design or layout of the activity;

Further alternatives to be included in the Final EIA

(c) the technology to be used in the activity;

Underground board-&-pillar

(d) the operational aspects of the activity; and

The underground will be accessed via a decline shaft. It is proposed that the decline shaft, plant and associated mine infrastructure be located on Portion 5 of the farm Kalabasfontein IS (see Map 2). Coal will be transferred from the underground to surface by means of a conveyor belt. Whereby, it will be sent to the plant area for processing (crushing, screening and washing). Mine residue from the plant will be disposed of onto an integrated disposal dump. Product coal will be sized and stockpiled in designated areas for pre-qualification prior to being trucked to market. It is currently anticipated that the plant will run 24/7

(e) the option of not implementing the activity.

The option of not approving the activities will result in the coal reserves not being mined on the applicable farm portions.

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 (specifically Chapter 6) 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 will/has been followed at all times and is based on reciprocal dissemination of information. The following was undertaken during the PPP thus far:

a) Identification of Interested and Affected Parties (IAPs);
b) Having a pre-application meeting with landowners on 26 September 2017 and 05 December 2017
c) Notification of IAPs regarding the proposed project via newspaper adverts (in the Ridge Times and the Middelburg Observer)
d) The Placing of site notices at conspicuous places including the Bethal and Hendrina libraries
e) The sending of notices to affected parties via registered post and the hand delivery of notices (in the form of Background Information Documents) to land owners and adjacent landowners.
f) The sending of notices to all identified I&APs via email, post and registered post inviting them to register and provide comments/objections.
g) Sending of notifications and hard copy reports to the most relevant Departments, including:
    i) DMR
    ii) DWS
    iii) Gert Sibande District Municipality
    iv) Msukaligwa Local Municipality
    v) Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA)
h) Inviting I&Aps to a public information day (open day) on 06 October 2017 at the Bethal Public Library;
i) Compilation and submission of results of consultation report to the DMR (as part of the Final Scoping Report and Final EIA Report); and

j) Providing IAPs with the opportunity to review and comment on the Draft Scoping (26 September 2017 to 26 October 2017) and Draft EIA Report (05 March 2018 – 19 April /2018) within the legislated public participation period of 30 days at the following public libraries

- Hendrina (44 Kerk Street, Hendrina, 1095, Tel: 013 293 0000); and
- Bethal Public Library (Danie Nortje Street, Bethal, Tel: 017 624 3029)

k) Making all reports available electronically via the Ecoelementum website: (http://ecoelementum.co.za/downloads/)

l) Gathering comments, issues and concerns from IAPs and responding to IAP comments, issues and concerns;

Summary of issues raised by I&Aps

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

Table 10: Summary of Issues Raised by I&Aps

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				
Owner of Freemax Farms **(including all Vaalbank and Kalabasfontein Farm portions)** Mr Darrel Kadish Mr Fred Kadish	**05/12/2017** Discussion with landowner (Mr Fred Kadish) on farm **26/09/2017** Person consulted, copy of BID and Draft Scoping Report given)	• Mr. Kadish states that they will not oppose the Mining Right Process • There are 4 houses on the property that houses people from the local community. These residents will have to be relocated • Cattle pens are also found on site	The socio-economic study will take cognizance of the community being housed on site and will recommend appropriate mitigation/solutions	Thank you, this will have conveyed to the applicant so that the relevant resettlement plans can be implemented
Owner of Rietkuil Farm Mr Carel Steenkamp **X**	**24/10/2017**	• Permission is not given for the farm to be mined. The farm is owned by the Steenkamp/Kruger families and now permission has been granted by them.	The objection has been noted. To this effect, the preferred Alternative (Alternative 1 on the farm Kalabasfontein) has also been applied for and assessed.	

		• The ground will become useless due to a lowered groundwater table level and pollution which will render the land useless for farming practices. No mention has been made about rehabilitation of ground and such processes take a long time. • The land will have to be bought and all beneficiaries will have to agree on the purchase price. • The farm must also be sold as an entire entity	A rehabilitation and Closure Plan has been prepared as part of the EIA Report (Annexure 6)	
Platorand Verspreiders CC Riaan van Rensburg	**04/10/2017** Registered Post sent			
Landowner Carel Johannes Kruger	**04/10/2017** Registered Post sent			
Bankpan Meyer de Jager \/ (Cornelia von Wielligh)	**04/10/2017** Registered Post sent			
Land owner Mr. Braam Jordaan	**04/10/2017** Registered Post sent			
Lawful occupier/s of the land				
Zikalala family The Zikalala farmstead is located on Kalabasfontein 232 IS farm	**11/01/2018** **Interview with family as part of the Social Impact Study**	The family has indicated that they would not be opposed to moving, given that they would be allowed to continue farming on a different piece of land which will allow sufficient space for their cattle, sheep and goats to graze. The family has small vegetable garden for the use of the family and does not use the land for crop production.	A resettlement agreement or lease agreements must be agreed upon by the Mine Contractor and the Zikalala Family Members residing on the Kalabasfontein site	

Rietkuil Beneficiary Group Mr Hugo Steenkamp (Part of the Steenkamp Family) **X**	**22/10/2017**	Concerned that no consultation was undertaken with him as he is part of the Steenkamp family who owns Rietkuil Farm	Thank you for comment, you have been added to the stakeholder database and will be informed of the process going forward.	
Rietkuil Beneficiary Group Ms Anja Louise De Wet & Daniel De Wet (Father of Anja de Wet)	22/10/2017	As a co-beneficiary of the Rietkuil farm, the following issues are raised: • The Farm and environmental will be polluted by the activity and the land and water resources will become unusable for farming • The family will not be able to sell the farm for farming purposes due to the polluted water resources and land. It would have to be sold at a huge discounted price • Currently no suggestions on the rehabilitation of the water source or land are provided form, making both useless • Rietkuil is owned by the Steenkamp/Kruger families by way of inheritance and no beneficiary has agreed to mining activities on the farm • The land will have to be bought and all beneficiaries will have to agree on the purchase price. The farm must also be sold as an entire entity	• The objection has been noted, thank you • To this effect, the preferred Alternative (Alternative 1 on the farm Kalabasfontein) has also been applied for and assessed. • A rehabilitation and Closure Plan has been prepared as part of the EIA Report (Annexure 6) • Please refer the EIA for the impact risk assessment and the EMP for the mitigation and management measures regarding water resources • Negotiations regarding the purchasing of land/farm will be done directly with the application, Diepsoils Investments and separate consultations will take place with the landowners to this effect.	
Rietkuil Beneficiary Group Ms Talitha Danielle De Wet **X**	22/10/2017	Same as above		

Rietkuil Beneficiary Group Mrs Louise Gouverneur **X**	24/10/2017	Same as above		
Rietkuil Beneficiary Group Mrs Martine Nolte **X**	24/10/2017	Same as above		
Rietkuil Beneficiary Group Mrs Lizelle Faurie **X**	20/10/2017	Same as above		
Rietkuil Beneficiary Group Prof Stoffelina Louisa Hendrika Els **X**	24/10/2017	Same as above		
Rietkuil Beneficiary Group Mrs Elze Hoffman **X**	22/10/2017	Same as above		
Rietkuil Beneficiary Group Mrs Carien Grobler **X**	22/10/2017	Same as above		
Rietkuil Beneficiary Group Mr Johan Coenraad Steenkamp **X**	22/10/2017	Concerned that no consultation was undertaken with him as he is part of the Steenkamp family who owns Rietkuil Farm. Other issues are: • Rehabilitation is very expensive and is very important	Refer to comment above	

		• Mining activities will result in degradation of the land • Land will become unsuitable for herding activity • Risk of water pollution • Value of the land will fall • Consideration must be given to purchase the land first as 20 years of life of mine is undesirable • Also notes that the farm is currently in pristine condition and is used for grazing		
Rietkuil Beneficiary Group Mrs Louisa Elizabeth van Tonder (Nee Steenkamp) **X**	22/10/2017	As above. Also notes that the farm is currently in pristine condition and is used for grazing	Thank you for comment, you have been added to the stakeholder database and will be informed of the process going forward	
Landowners or lawful occupiers on adjacent properties				
Municipal councillor				
Municipality Msukaligwa Local Municipality **X**	26/09/2017 Registered Post			
District Municipality Gert Sibande Municipality	04/10/2017 Registered Post			

X				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)	Registered Post and Emailed			
Transnet Thami Hadebe **X**	Registered Post and Emailed	Not Affected by (Director: Environmental Management the proposal	Noted	
ESKOM **Noxolo Galela – Land Management** Milton Moloko	26/09/2017 Registered Post and Emailed			
Communities				
Business Chamber/Forum Mr Thulani Maseku Ms Precious Masondo Mr Fankhina Nhlafho [sic] **X**	**06/10/2017** Attended the open day meeting at Bethal library	• Taxi's are the only mode of transport from Bethal to the various mines. Busses must also be made available to employees such as in Hendrina • The community could have issues with the Social and Labour Plan (SLP) and therefor the community must have opportunity to view the Plan. The SLP must presented in a meeting whereby communities can provide input • Employment selection and process must be contained within the SLP • The process must also include the Davel Community	Thank you for your participation and input. • The issues raised will be • Please refer to the draft SLP attached as Annexure 7 for review and comment • Preference will be given to local employment structures and suppliers if the mine is approved. • Refer to mitigation measures discussed under the traffic impact assessment section	

		• The Youth forum must also be included in the process • Concerned about the impact the mine will have on road infrastructure in the area • The mines are not contributing to the Bethal Community • Concerned about the trucks overnighting in Bethal illegally		
Msukaligwa farmers association	**To be informed**			
Dept. Land Affairs (Commission On Restitution of Land Rights) **X**	**22/10/2017**	No claims has been lodged against the properties		
			No comment	N/A
Traditional Leaders			No comment	N/A
Dept. Environmental Affairs **MDEDET (now DARLEA)** Musa Mondlane (Director: Environmental Management) **X**	Emailed and Registered Letter Sent Hard Copy Scoping report sent for comment			
Dept. Water and Sanitation Mr Musa Lubambo **X**	**05/10/2017**	Comment will be provided in terms of the National Water Act		

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

1. **Baseline Environment**
   a. **Type of environment affected by the proposed activity.**
      (Its current geographical, physical, biological, socio- economic, and cultural character).

3.1 CLIMATE

- **Methodology and Data Sources**

  - DWA weather station Witbank at Witbank dam.
  - Diep Vaalbank Coal Air Quality Assessment Report (Ecoelementum, 2018)

- **Regional Description**

The mean circulation of the atmosphere over Southern Africa is anticyclonic throughout the year (except near the surface) due to the dominance of the three high pressure cells, namely South Atlantic High Pressure, off the west coast, the South Indian High Pressure off the east coast and the Continental High Pressure over the interior. It is these climatic conditions and circulation movements that are responsible for the distribution and dispersion of air pollutants within the proposed Diep Vaalbank Coal project area and between neighbouring provinces and countries bordering South Africa. the predominant wind direction is predicted to occur mainly from the east-north-east direction more than 1300 hours per year, secondary winds can be expected from the west to the north-west 2400 hours per year. Winds from the east is predicted to occur 930 hours per year. At the site, calm conditions with wind speeds of 12km/h or less, are predicted 2-7 days per month throughout the year. 12-19 km/h winds are predicted 10-16 days per month through the year. Wind speeds of more than 19 km/h are predicted to occur 8-17 days per year on average.

In the summer months' maximum average daily temperatures are predicted to be 23°C to 26°C on average with a maximum of 31°C possible during hot days, dropping to a predicted 9°C to 13°C on average at night and 4°C minimum on cold nights. During winter months the average day time temperature are predicted in the 17°C to 24°C range while cold winter night time temperatures predicted to drop to -4°C. Falling in a summer rainfall area, the location is predicted to receive the most precipitation in the summer months of October to March overall. November to January are predicted the highest rainfall months with between 85 mm to 107 mm predicted per month during these months. February, March and October is predicted to receive 54 mm to 76 mm precipitation. All other months are predicted to receive less than 26 mm precipitation on average during the month.

- **Sensitivities**

No site-specific data of particle size for the various sources are available due to the site being a green fields site. It is recommended that ambient air quality monitoring be established to get a baseline condition prior to the onset of the operations and in order to establish the level at which the proposed operations are noted to impact on the ambient air quality

3.2 GEOLOGY

- **Methodology and Data Sources**

  - Diep Vaalbank Coal Groundwater Impact Assessment Report (Geo Pollution Technologies – Gauteng (Pty) Ltd, 2018)

- **Regional Description**
  The investigated area falls within the 2628 East Rand 1:250 000 geology series map and is characterised by consolidated sedimentary layers of the Karoo Supergroup. The Karoo Supergroup consists mainly of sandstone, shale and coal beds of the Vryheid Formation of the Ecca Group and is underlain by the Dwyka Formation of the Karoo Supergroup. The regional geological map (geoscience, 2013)) shows that the area is dominated by Karoo's Vryheid Formation. The Vryheid formation was intruded by dolerite dykes.

  The project area is dominated by the Vryheid Formation (Pv) with minor dolerite dykes (Jd) on the south-western corner and south-eastern corner of the farm Vaalbank. The south-eastern dolerite suite was further intruded by a thinner East West striking dolerite dyke. The bigger portion of the project area is located within the Witbank Coal Field and a smaller part of project is within the Ermelo Coal Field. Evender and High Veld Coal fields are located at about 20km to the south west of the project area near Bethal as shown in Figure 6

- **Sensitivities**
  No systematic sampling of the lithologies has been conducted to date (currently underway). Quaternary alluvium associated with the wetlands crosses larges areas of the mining area.

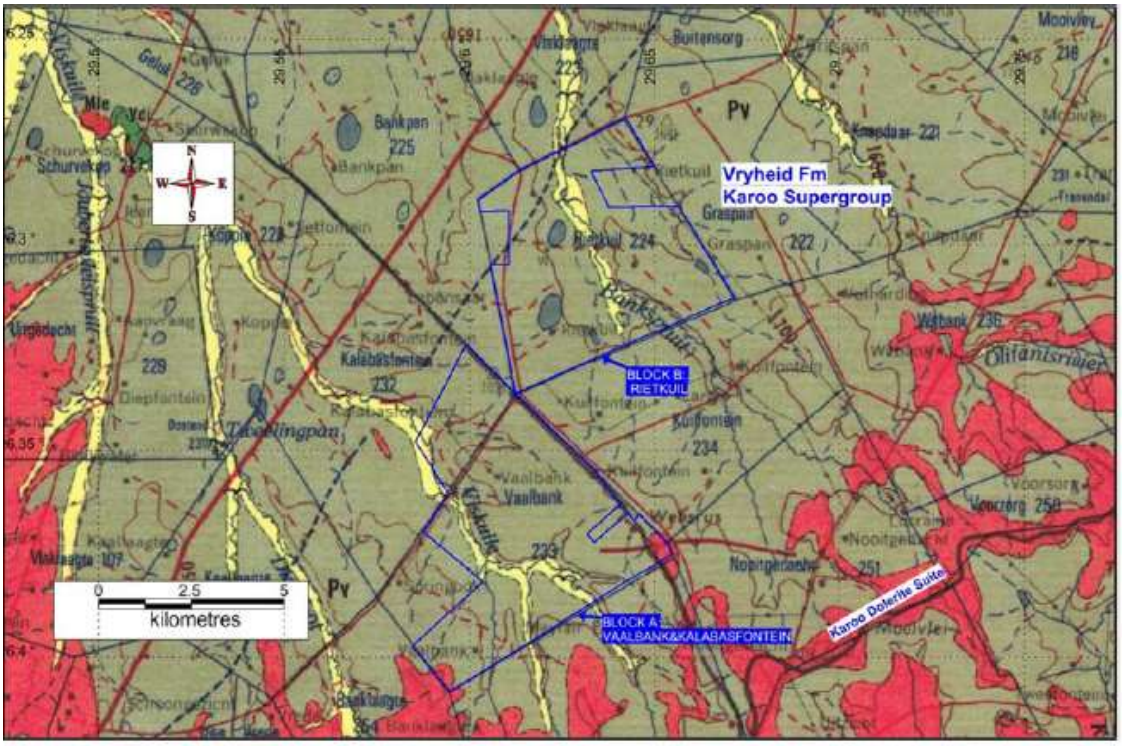


Figure 15: Geological Map

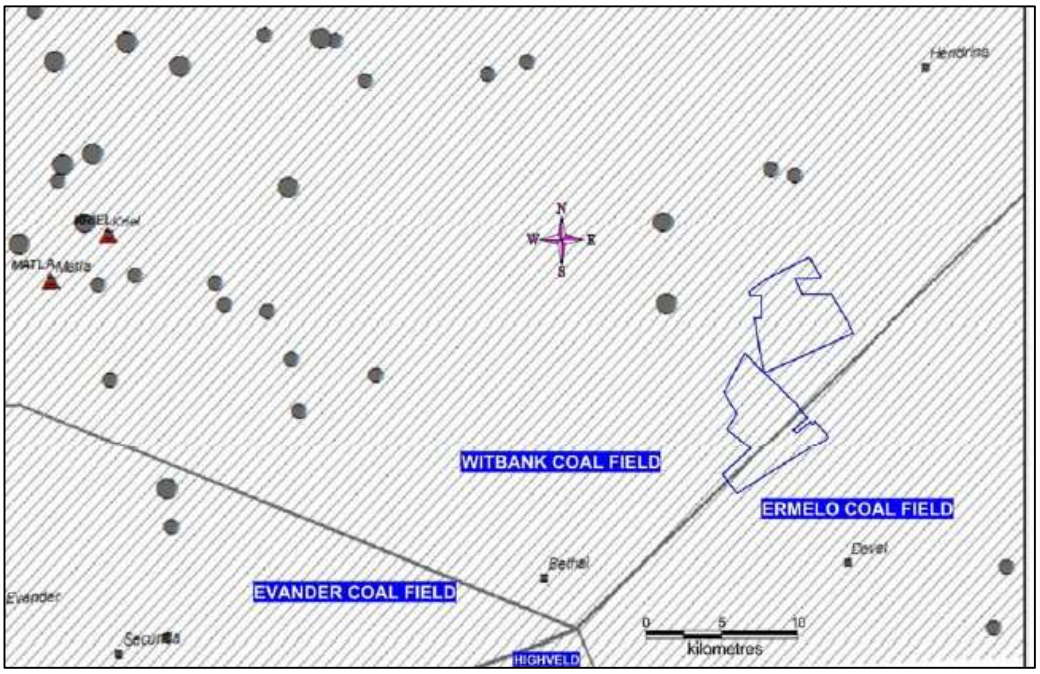


Figure 16: Distribution of known Coal Fields relative to the Diep Vaalbank Colliery Project

3.3 GROUNDWATER

- Methodology and Data Sources
    - Diep Vaalbank Coal Groundwater Impact Assessment Report (Geo Pollution Technologies – Gauteng (Pty) Ltd, 2018)
- Regional Description
    - **Aquifer(s)**
      Through the hydro-census study it can be concluded that the aquifer system in the study area can be classified as a "Minor Aquifer System", based on the fact that the local population is dependent on groundwater, but low yields are expected from this aquifer. A minor aquifer system is described as *"fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although these aquifers seldom produce large quantities of water, they are important for local supplies and in supplying base flow for rivers."* The aquifer vulnerability for a contaminant released from surface to a specified position in the groundwater system after introduction at some location above the uppermost aquifer was determined and assessed to be medium with a 54% vulnerability value.
    - **Boreholes**
      Twenty-three (23) boreholes were found during the hydrocensus. The water levels in most of the boreholes represent water levels being pumped for water supply. The ambient water level is thought to be 0 to 5 mbgl with discharges at lower points such as the fountain
    - **Groundwater Quality**
      Groundwater quality was assessed in terms of the SANS 241-1:2015. The following results were derived:
        - The major cations in the groundwater samples are calcium and sodium.
        - The major anions in the groundwater samples are sulphate and bicarbonate.
        - Elevated nitrate and ammonia was found, which is thought to be farming related.
        - Manganese was elevated in certain samples, which is thought to be geology related.

- The groundwater quality can be described as water that has been affected by mining related contamination.

- Sensitivities
  - During the operational phase, it is expected that the main impact on the groundwater environment will be de-watering of the surrounding aquifer.
  - As some discards and exposed reactive mineral surfaces will remain in the mine, this outflow could be contaminated as a result of mine drainage.
  - Potential negative impact on receptor such as:
    - Groundwater user abstracting contaminated groundwater through a borehole for domestic use, livestock watering or irrigation.
    - Aquatic fauna and flora in a receiving watercourse.
    - Any water user abstracting water from an impacted watercourse.
    - A definition of the identified receptors.

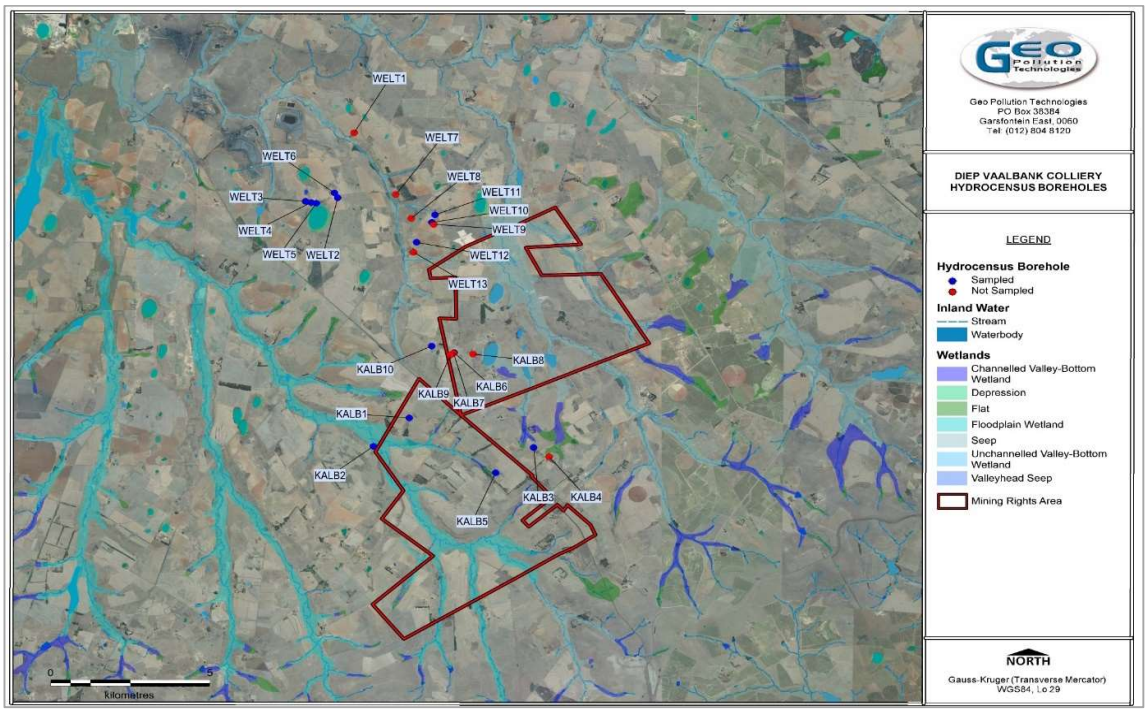


Figure 17: Hydro-census Borehole Locations

3.4 TOPOGRAPHY

- **Methodology and Data Sources**
  - Soil, land use, land capability and agricultural potential study for Diep Vaalbank Coal (Rossouw Associated, 2018)
  - Surveyor General 1:50 000 topocadastral map sheet

- **Regional Description**

The topography of a particular area will determine the following factors:

- Flow of surface and groundwater;

- Depth of soils and the potential for soil erosion, dependent on the slope of the study area;
- Type of land use;
- Aesthetic appearance of the area; and
- Climatic factors such as wind speeds and direction.

The regional topography is described as slightly to moderately undulating plains, including some low hills and pan depressions. For the Vaalbank portion the general slope and drainage is from the southeast to the northwest across the site, with an average slope of 1%.

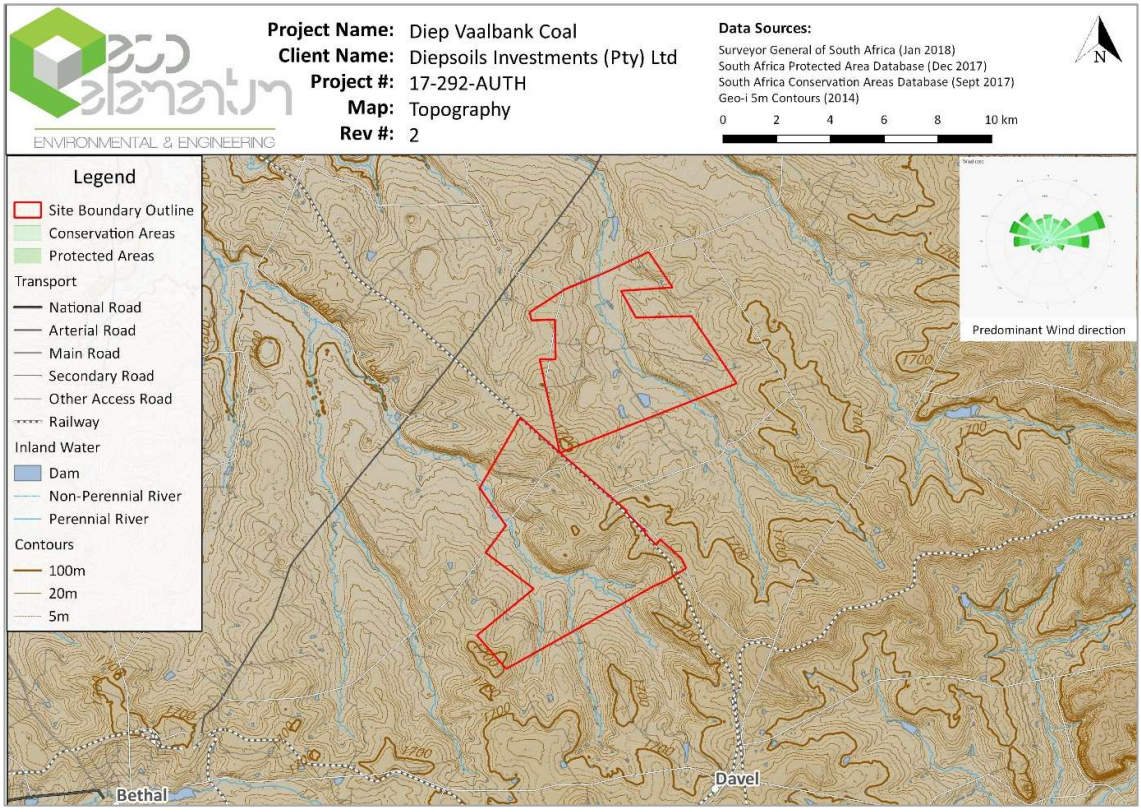


Figure 18: Topography

- **Sensitivities**

There are numerous streams flowing from the southeast to the northwest across portions where underground mining would likely take place.

3.5 Soil, Land Use, Land Capability And Agricultural Potential

- **Soils**:

Ten different soil forms were identified within the three site alternatives assessed. These soil forms include oxidic forms where red or yellow-brown apedal horizons dominate the depth of the profiles observed. Whereas the south-western sites (preferred site at the top and alternate site 2 at the bottom) are dominated by soils with apedal soils with distinctive red colours, the site located in the northeast (alternate site 1) is dominated by yellow-brown colours in the B1-horizon.

Table 11: Summary of Soil forms and land capabilities

Soil form	Preferred Site (ha)	Alternate Site 2 (ha)	Alternate Site 1 (ha)	Land Capability
Avalon	0	0.3	0	Arable
Bainsvlei	3.99	1.58	0	Arable
Bloemdal	3.26	3.33	0	Arable
Clovelly	0	0	0.48	Arable
Glencoe	0	2.43	6.47	Arable
Hutton	1.01	0	0	Arable
Lichtenburg	0.34	0.43	0	Arable
Longlands	0	0	0.68	Wetland
Rensburg	0	0	0	Wetland
Wasbank	0	0	0.97	Wetland

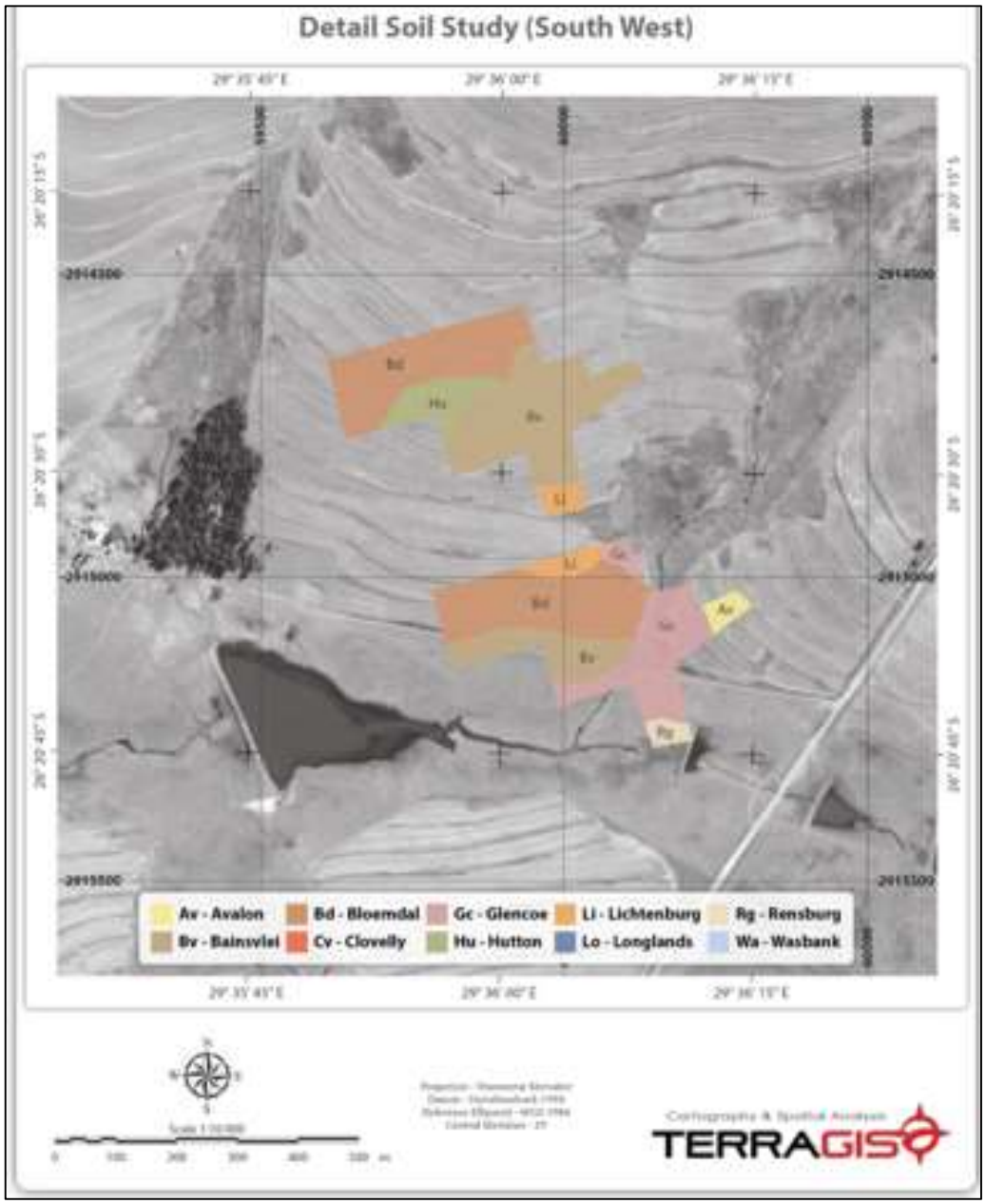


Figure 19:5 Detailed soil map

- **Land capability and agricultural potential**:

The underground mining area is dominated by the Bb land type. These areas are dominated by plinthic catena soils. Extensive seep zones are encountered and wetland systems can stretch over vast stretches of land. These areas are dominated by high potential arable land. Within the Diep Vaalbank Coal Mining Right Area, this land class comprises of the Bb4 land type. Smaller pockets of the Ea land type is also present. This land type comprises of soils dominated by vertic and melanic A-horizons and structure B-horizons. The Ea land type is represented by land types Ea20 and Ea23. Both Ea20 and Ea23 mainly comprises soils that fall into the high potential grazing land capability and low to medium potential arable land capability classes. Wetland are encountered in low lying areas. Extensive seep zones are seldom encountered.

Although the soil forms found within the Preferred Site are suitable for irrigated crop production, the relatively high current average rainfall for the area deems irrigation an unnecessary practice in a water-scarce country such as South Africa. The Rensburg soil of Alternate Site 2 is not suitable for irrigation as it gets water-logged easily and poor internal and external drainage will result in anaerobic conditions suffered by plant roots.

- **Sensitivities**
  The project will have a negative impact wherever the activities result in surface disturbance and/or affect the sub-surface water table. However, since the mine is largely underground and the planned surface footprint approximately 10 ha, the activity may be permitted if the footprint is kept this small and strict soil management and monitoring is adhered to.

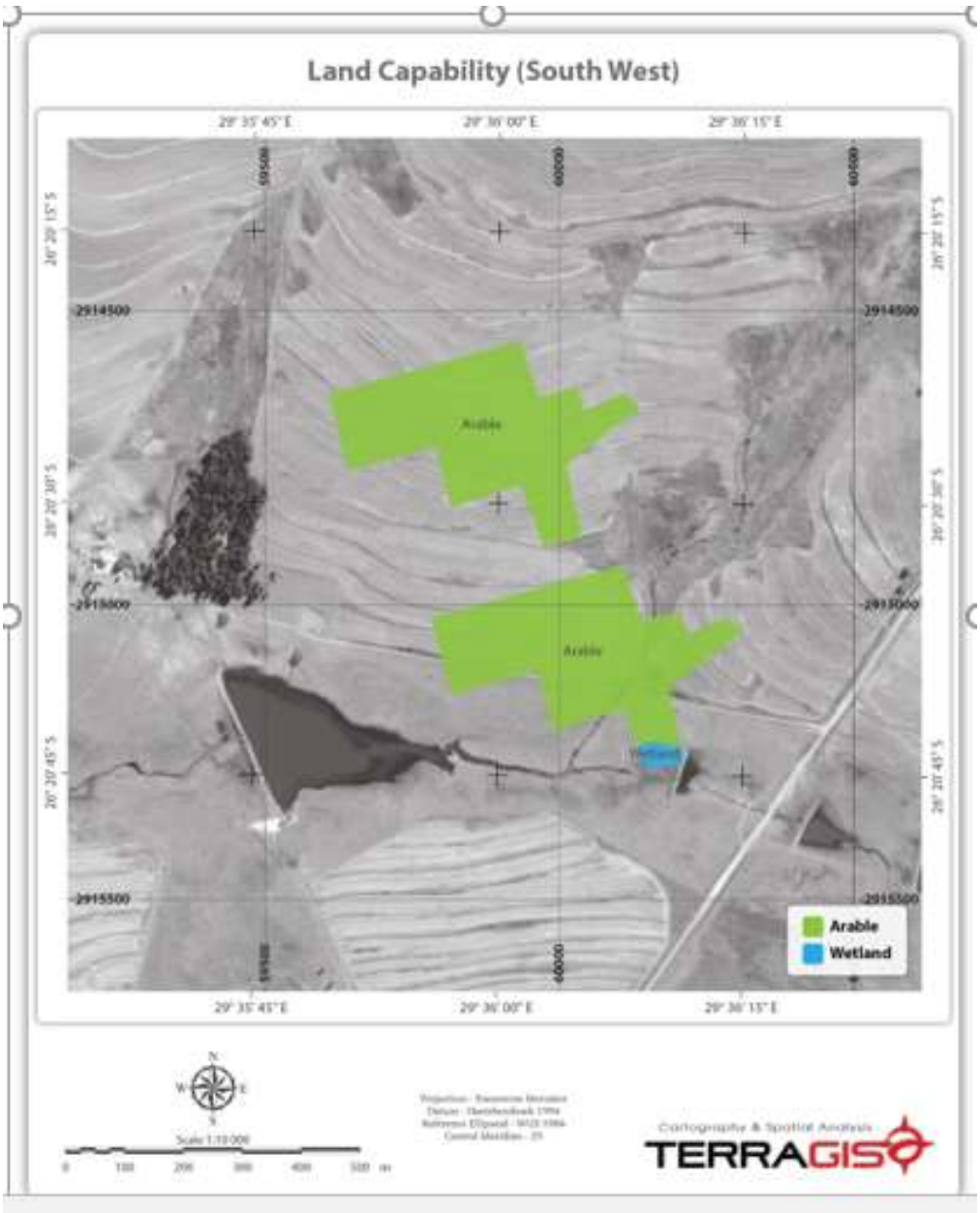


Figure 20: Land Capability Site 1

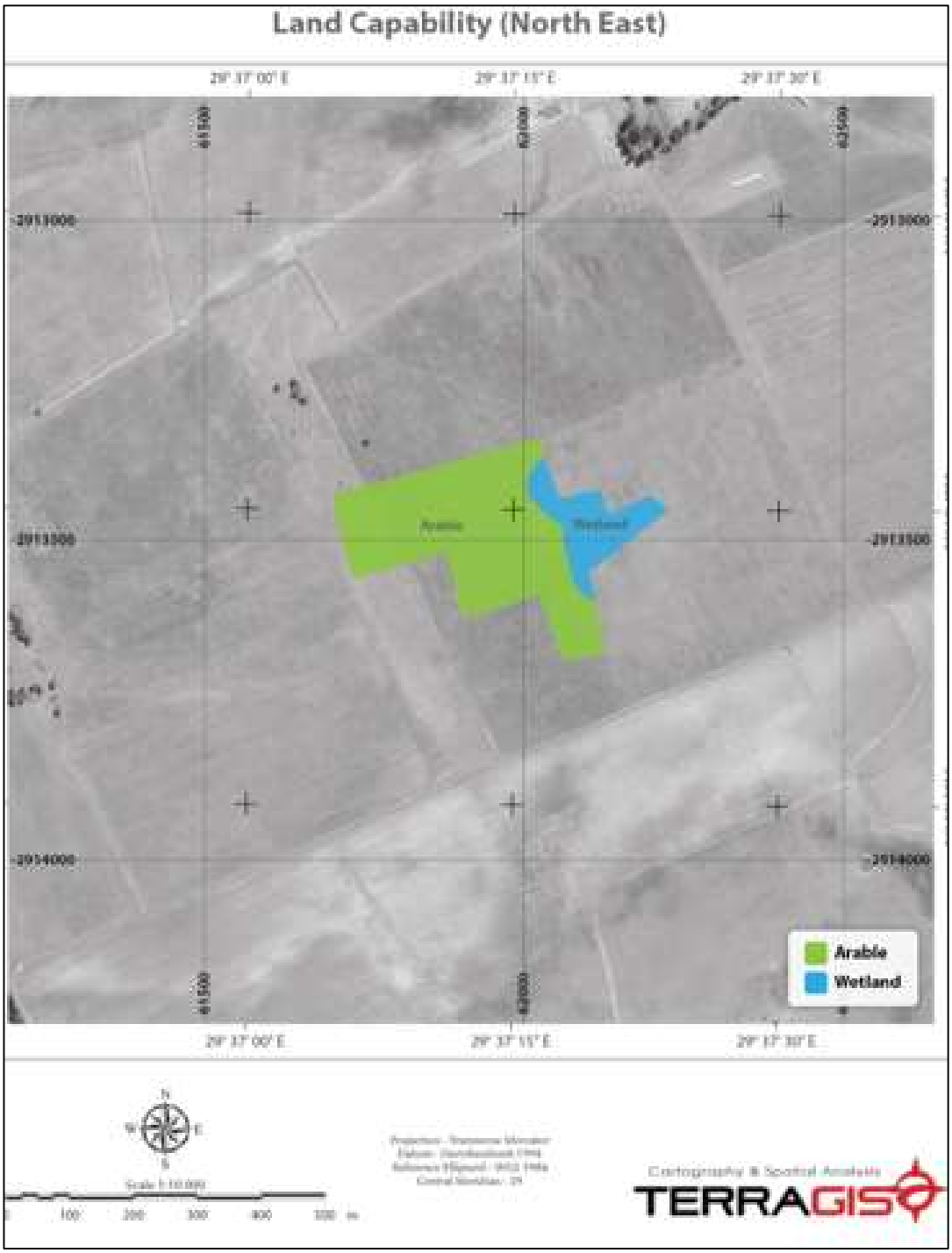


Figure 21: Land Capability Site 2

3.6 SURFACE WATER

- **Methodology and Data Sources**
  - Aquatic ecological assessment for Eco Elementum (Pty) Ltd Diep Vaalbank Colliery (Menco,2018)
  - Wetland Delineation Study for Eco Elementum (Pty) Ltd Diep Vaalbank Colliery (Menco,2018)

- **Regional Description**

Streams and Rivers:

The surface water study area for the Diep Vaalbank Coal Project falls within the Olifants Water Management Area (quaternary drainage area B11A.). The Klein Olifants River and Wilge River are two of the seven major rivers in the Olifants WMA. The catchments are mostly independent of each other and the rivers drain into the Limpopo River. The water resources within the vicinity of the project area include Viskuile, Bank Spruit; Diepsloot; and Upper Olifants River

Table 12: Regional characteristics of the catchment area

Attribute	*Project Details*
Water User	Diepsoils Investment: Diep Vaalbank Coal
Water Management Area	Olifants
Sub-water Management Area	Upper Olifants
Quaternary Drainage Region	B11A
Level 1 Eco-region	Highveld
Level 2 Eco-region	11.02
Rivers	Viskuile
DWS Ecological Importance	High
Rec. Ecological Category	***Class C: Moderately Modified***
SANBI 1999 PES	***Class C: Moderately Modified***
SANBI NFEPA Status	High

Wetlands:

Regionally, both alternatives for the project falls within NFEPA wetland areas (namely class C and DEF). The wetlands on site, were identified as a Channelled VP and a floodplain wetland.

Table 13: NFEPA Wetland Categories

PES equivalent	NFEPA condition	Description	% of total wetland area*
Natural or Good	AB	Percentage natural land cover ≥ 75%	47
Moderately modified	C	Percentage natural land cover 25-75%	18
Heavily to critically modified	DEF	Riverine wetland associated with a D, E, F or Z ecological category river	2
	Z1	Wetland overlaps with a 1:50,000 "artificial" inland water body from the Department of Land Affairs: Chief Directorate of Surveys and Mapping (2005-2007)	7
	Z2	Majority of the wetland unit is classified as "artificial" in the wetland delineation GIS layer	4
	Z3	Percentage natural land cover < 25%	20

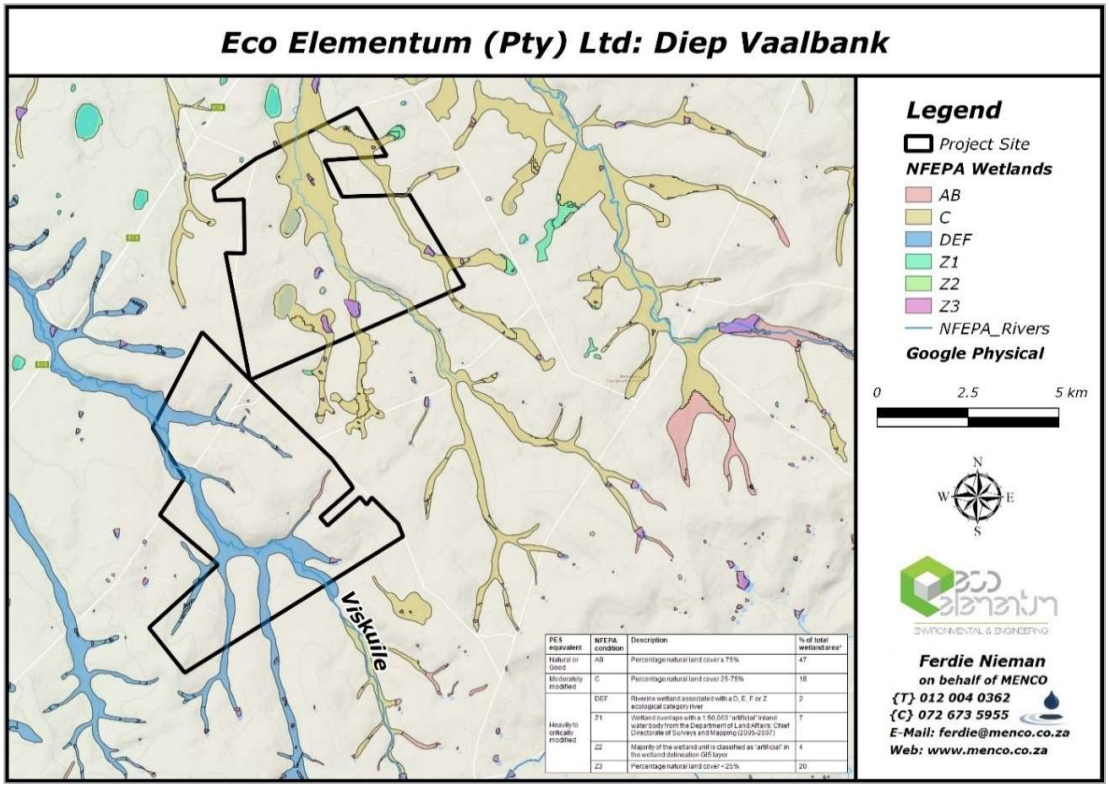


Figure 22: NFEPA Wetlands

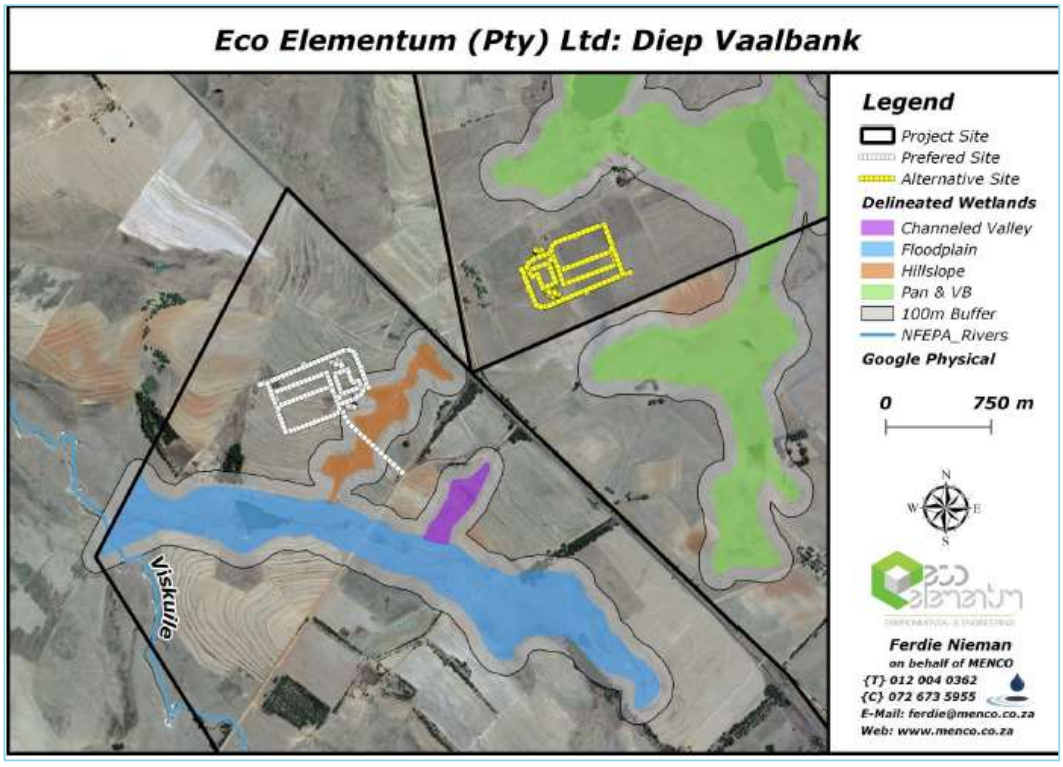


Figure 23: Delineated Wetland with buffers

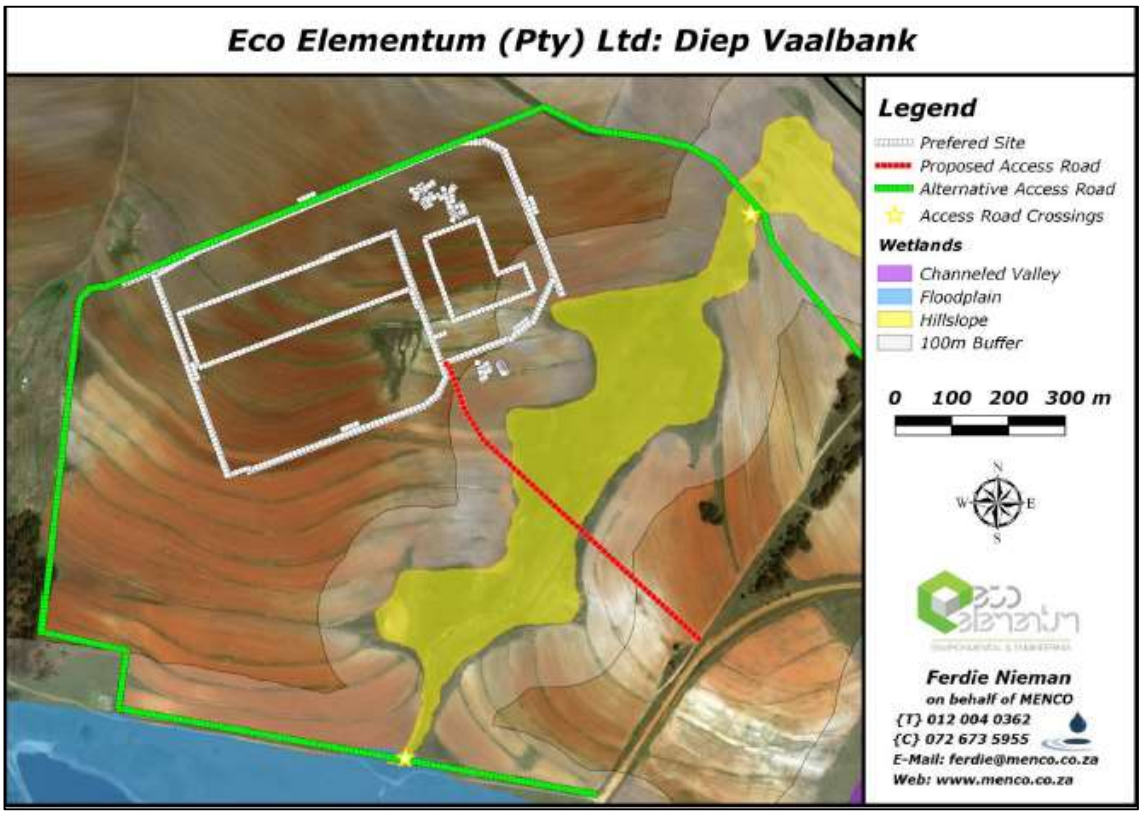


Figure 24: Delineated Wetland with buffers and alternative road

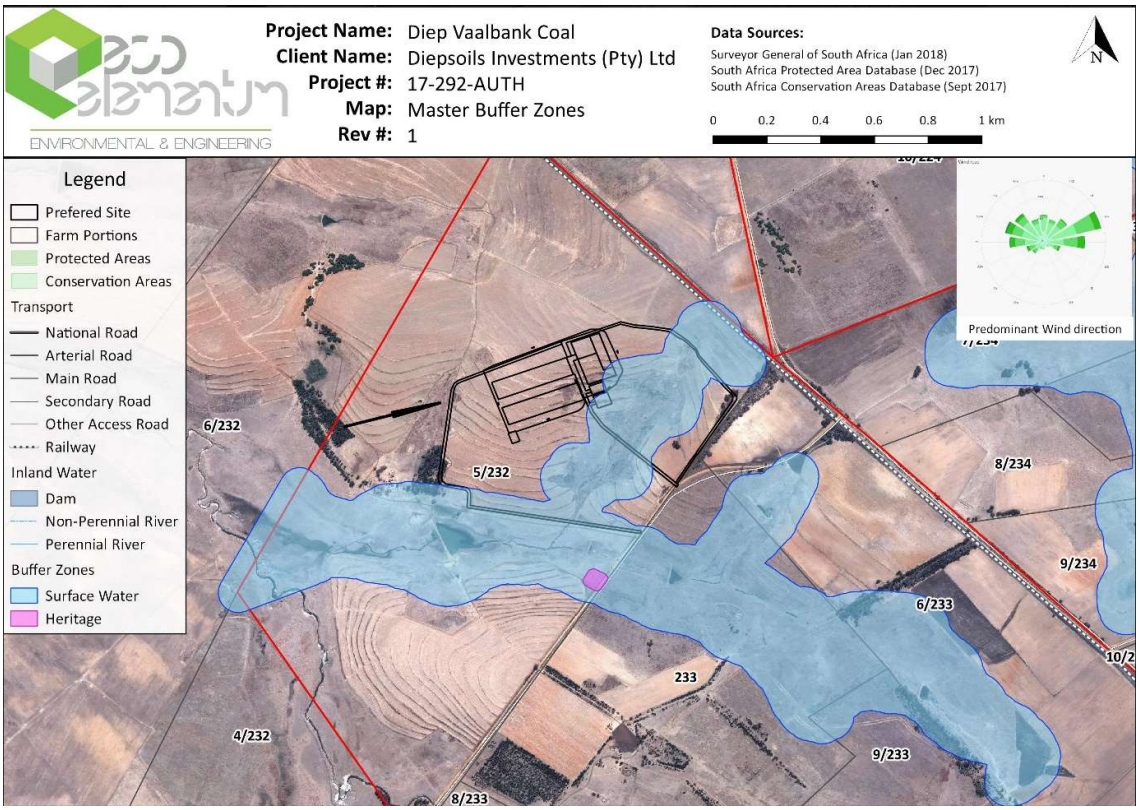


Figure 25: Preferred Layout and 100M buffer zone

- **Sensitivities**
  - Wetlands areas are associated with the larger study area. The wetland specialist has proposed a 100-meter buffer zone.
  - The preferred alternative (Alternative 1 on Portion 5 of the Farm Kalabasfontein) proposed the upgrading of an access road that crosses a hillslope seepage wetland (see photo below)

Figure 26: Photo of existing access road crossing Hillslope Seep (Alternative 1)

3.7 TERRESTRIAL ECOLOGY

- **Methodology and Data Sources**

Diep Vaalbank Vaalbank Coal Mine Diepsoil Investments Ecological Report (Ecoelementum, 2018)

- **Regional Description**

Most of the site falls within the Eastern Highveld Grassland (Gm 12) vegetation type of the Grassland Biome. According to the Mpumalanga Biodiversity Sector Plan (MBSP) as well as in the National List of Threatened Ecosystems, the Eastern Highveld Grassland's conservation status is Endangered (Mucina & Rutherford, 2006), with a conservation target of 24%. Only a very small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and in private reserves (Holkranse, Kransbank, Morgenstond), with the description of Protection Status from SNBA as Hardly Protected. The vegetation is short dense grassland dominated by the usual Highveld grass composition.

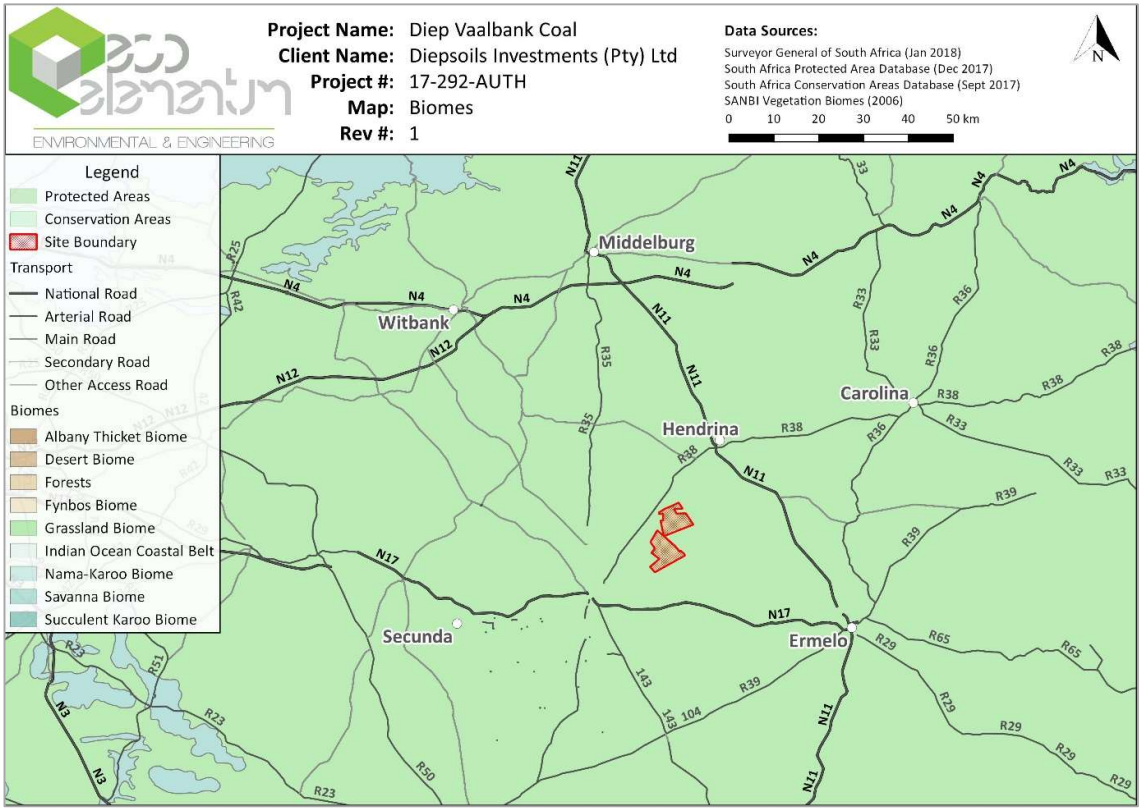


Figure 27: Biomes of South Africa

- **Sensitivities**
  - The site is considered moderately to heavily modified but both aquatic and terrestrial CBA and ESA occur on the farm
  - The majority of the larger wildlife no longer exists within the project area that said they could still use this grassland as foraging grounds seeing that access to the site is relatively easily attained via gaps in the fencing. No signs of larger mammal life were observed whilst conducting the assessment.
  - The site falls within the "Unprotected region" of the Important Bird Areas region map

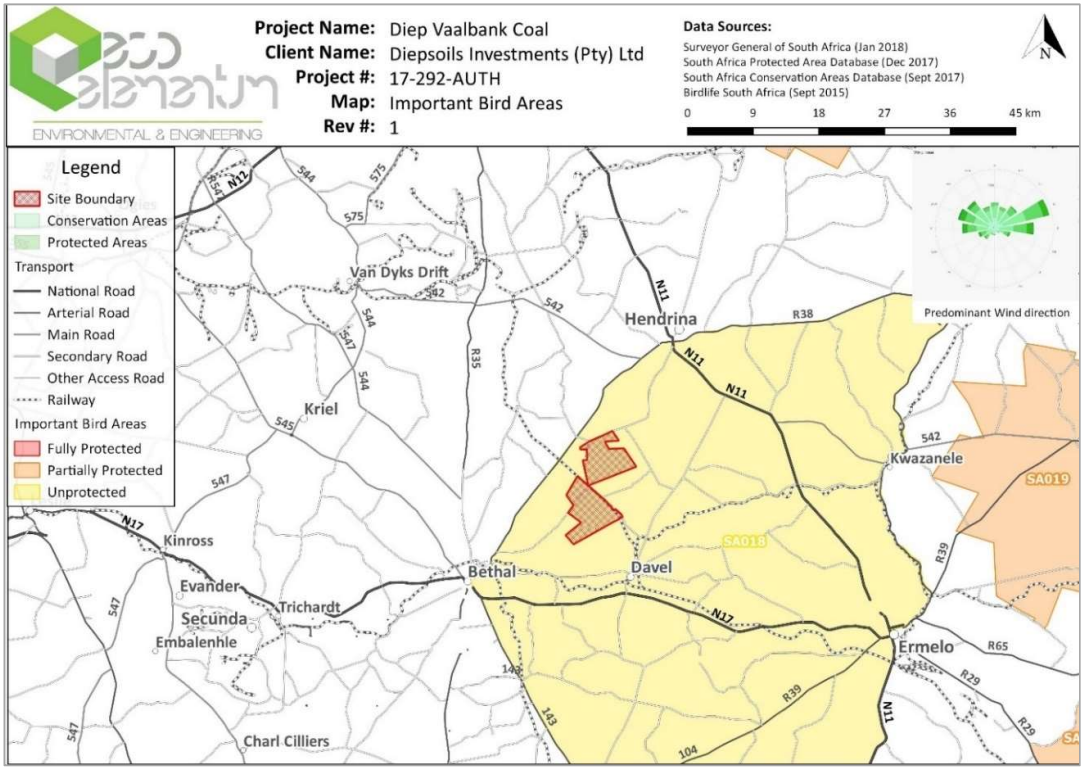


Figure 28: Important Bird Areas

Figure 29: Mpumalanga Spatial Development Plan

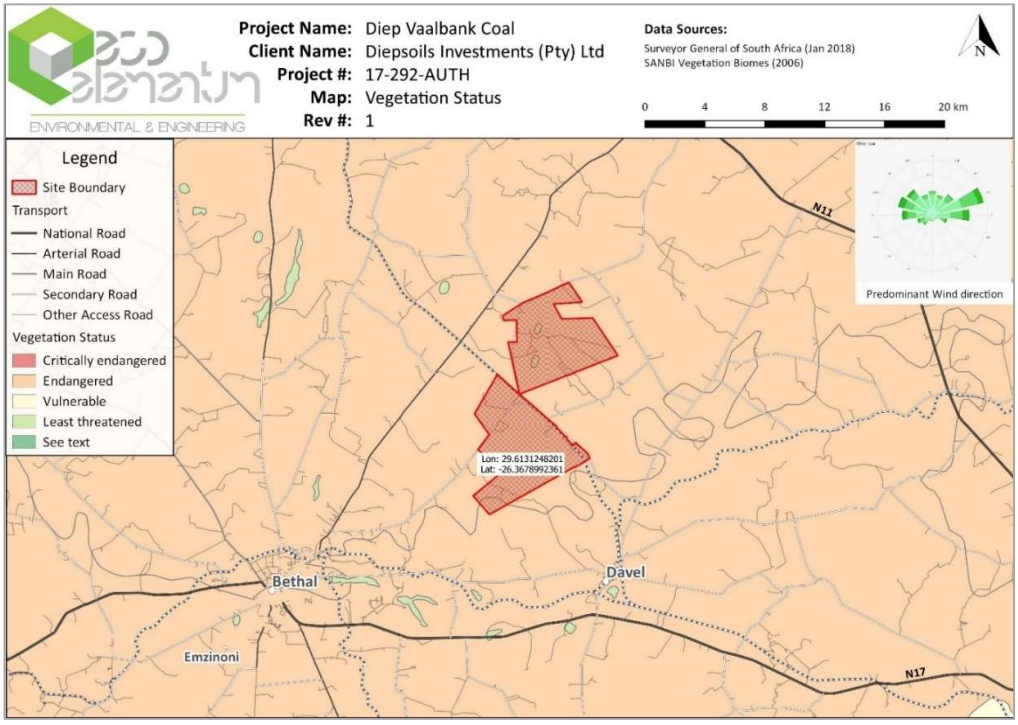


Figure 30: Vegetation Status Map

3.8 VISUAL IMPACT

- **Methodology and Data Sources**

Diep Vaalbank Vaalbank Coal Mine Diepsoil Investments Visual Impact Report (Ecoelementum, 2018)

- **Regional Description**

The proposed project area is situated in predominant agriculture area with dispersed homesteads in the immediate vicinity and within a flat landscape. Due to the small holdings, agriculture, dispersed natural vegetation and the topography the general area has a **low visual absorption capacity (VAC)**.

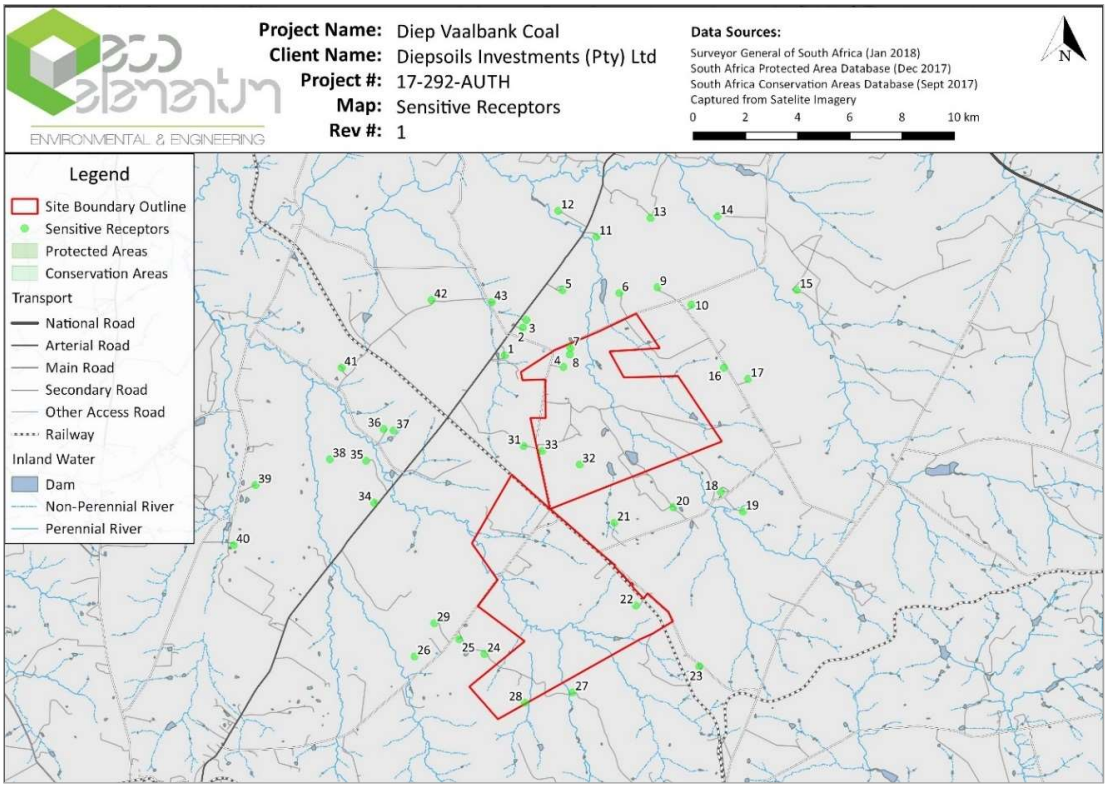


Figure 31: Sensitive Receptors

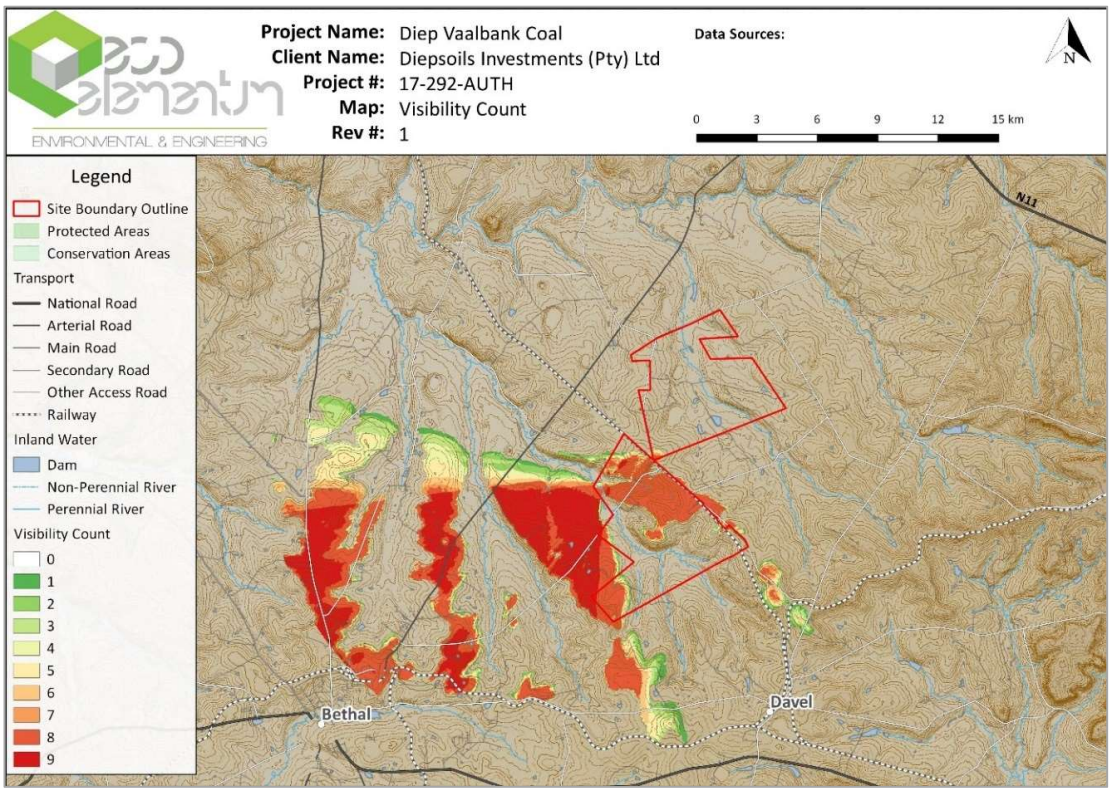


Figure 32: Viewshed of proposed Diep Vaalbank Coal project – Visibility Count

Table 14: Visibility Rating – Count of infrastructure visible of the proposed development

1 Structure	Very Low
2 – 4 Structures	Low
4 – 6 Structures	Medium
6 – 8 Structures	High
8+ Structures	Very High

- **Sensitivities**

Construction of proposed Diep Vaalbank Coal structures with its associated infrastructure will increase the cumulative visual impact of agriculture type infrastructure within the region. In context of the existing agricultural character, added structures will contribute to a regional increase in small and heavy vehicles on the roads in the region

3.9 CULTURE AND HERITAGE

Methodology and Data Sources

A Phase 1 Archaeological Impact Assessment for the Proposed Diep Vaalbank Coal Project Between Hendrina and Bethal, Mpumalanga (Tobias Coetzee, 2018)

Regional Description

- Mpumalanga has some of the richest geological, archaeological and cultural heritage in the world. The Karoo rocks contain massive seams of coal, which were formed in vast swamps from decomposing forests during a 100-million-year period between 200 and 300 million years ago, when Africa was attached to South America, India and Antarctica as part of the super-continent Gondwanan. Primitive plants, such as the famous Glossopteris flora, had colonised the entire southern hemisphere, and dinosaurs roamed across the landscape of Mpumalanga. Fossils of these animals are found in abundance and are commonly displayed in local museums.
- The majority of the Preferred and Alternative 1 Sites are located on cultivated land. However, a small section of the Preferred Site is located close to a settlement while the southern section of the Alternative 1 Site is located on an area used for grazing. The majority of the Alternative 2 Site is cultivated and the small section along the northern boundary used to be cultivated land in previous years

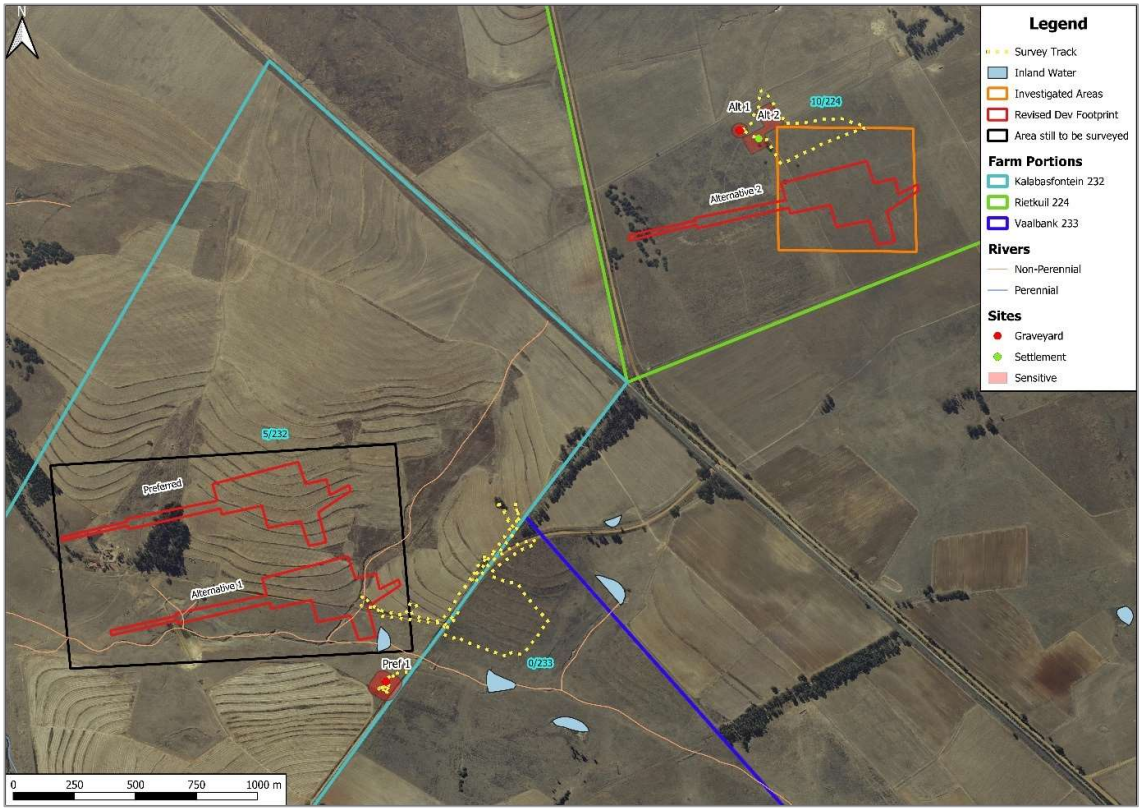


Figure 33: Heritage sites within the site boundary

Sensitivities

- One graveyard (Pref1) on Portion 5 of the Farm Kalabasfontein 232 IS and one graveyard (Alt1) near the Alternative 2 Site was observed including and an archaeologically sensitive area that might contain settlement foundations associated with one of the graveyards.
- Graveyard Pref1 is located about 180m south-southeast of the Alternative 1 Site location and consists of approximately 100 graves oriented in an east-west direction. All three areas fall outside of the demarcated study areas, and some distance from the proposed boundaries
- The graveyard located on Portion 5 of the Farm Kalabasfontein 232 IS is still in use and is more recent than the graveyard associated with the Alternative 2 Site.

3.10 PALEONTOLOGICAL

- **Methodology and Data Sources**

Palaeontological Impact Assessment: Phase 1 Field Study (Heidi Fourie, 2018)

- **Regional Description**

The Karoo Supergroup is renowned for its fossil wealth. The Vryheid Formation (Pe,Pv), Ecca Group is rich in plant fossils such as the *Glossopteris* flora represented by stumps, leaves, pollen and fructifications. Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of

Karoo Supergroup strata the palaeontological sensitivity can generally be LOW to VERY HIGH, and here locally **VERY HIGH** for the Vryheid Formation.

Fossils likely to be found are mostly plants (Appendix 1) such as '*Glossopteris* flora' of the Vryheid Formation. The aquatic reptile *Mesosaurus* and fossil fish may also occur with marine invertebrates, arthropods and insects. Trace fossils can also be present. The marine bivalve *Megadesmus* is found in the upper part of the Volksrust Formation near Newcastle (Johnson 2009).

- **Sensitivities**

There is some concern with the project due to the presence of the Vryheid Formation therefor all development activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.

3.11 Social And Economic

Methodology and Data Sources
Social Impact Assessment (2017)

Census, 2011 (StatSA, 2018)

Integrated Development Plan for the Msukaligwa Local Municipality (2012-2013)

Regional Description

- **Population**

According to Census 2011, Msukaligwa Local Municipality has a total population of 149 377 people, of which 88,1% are black African, 9,8% are white, 1,1% are Indian/Asian,and 0,6% are coloured. The other population groups make up the remaining 0,3%.

- **Language**

IsiZulu is the most spoken language in the municipality (71.4%) followed by Afrikaans (9,7%) and SisWati (8,4%).

- **Living Conditions**

There are 40 932 households in the municipality, with an average household size of 3,5 persons per household. The figures indicate that 53% of households have access to piped water in their dwelling and 25% have access to piped water in the yard. Only 9,4% of households do not have access to piped water. In Msukaligwa Local Municipality,74,7% of households have access to electricity for lighting.

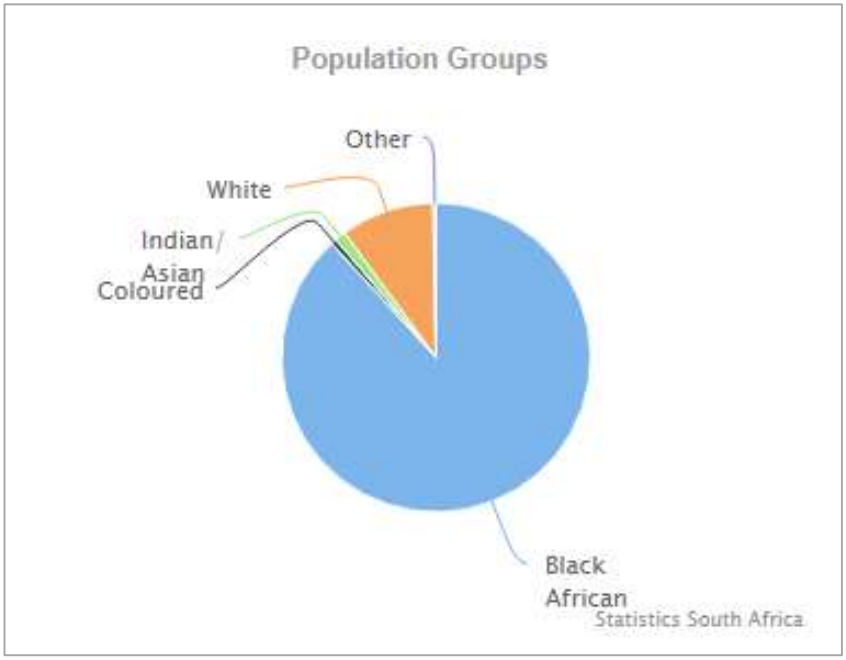


Figure 34: Population Groups

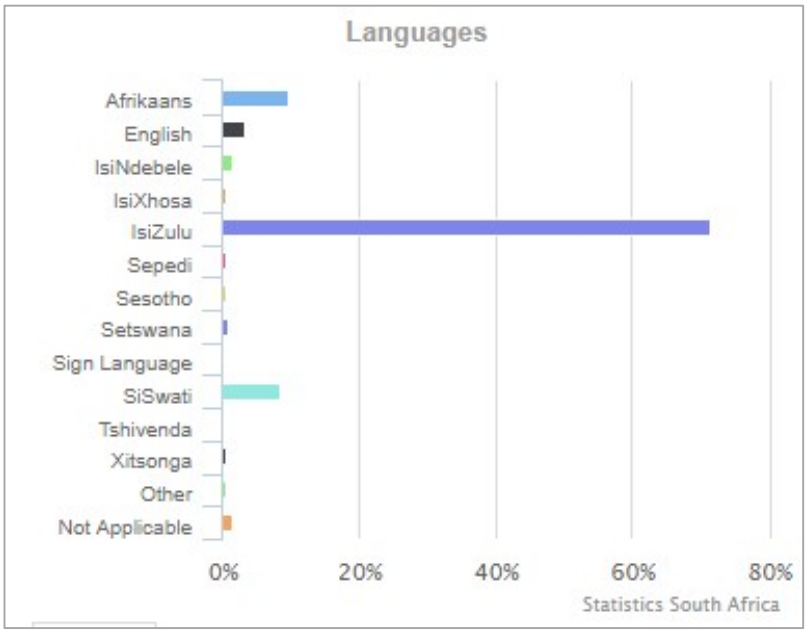


Figure 35: Languages

- **Settlements**

The settlement figures show that 80.1% of the population in the municipality reside in urban areas, with 19,9% residing on farms and 1% staying on Tribal/Traditional land.

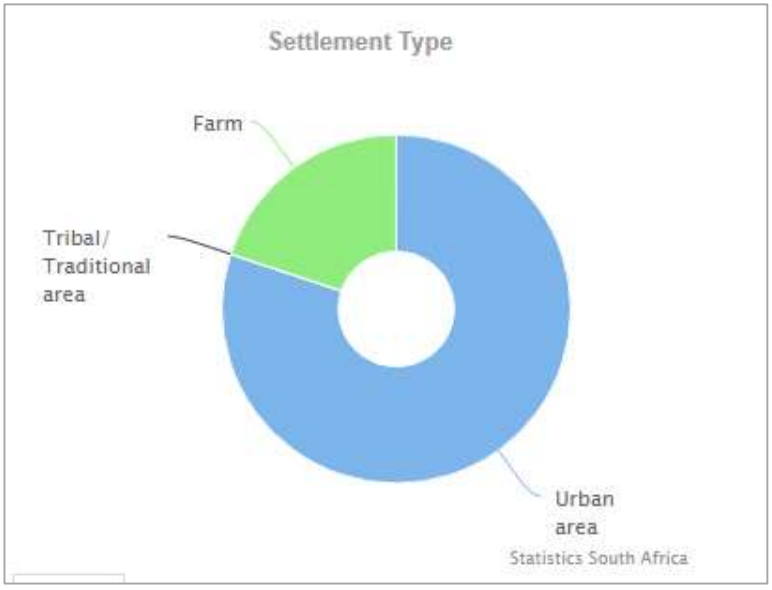


Figure 36: Settlement Types

- **Inequality and Poverty Levels**

The municipality is faced with challenges regarding people living below minimum living standards which impacts negatively on revenue collection and service delivery to the community. During the period 2001 to 2012, there has been a significant decrease on the percentage of people living in poverty. Though there is a decrease on people living in poverty the 37% is still high which implies that the municipality in collaboration with other state departments must work hard to deal with this challenge of reducing poverty levels within its communities.

- **Economy**

The mining sector contributes significantly to the GDP (22% of the provincial economy) followed by manufacturing at 12%, construction at 3%, and agriculture at 3% (Figure 37)

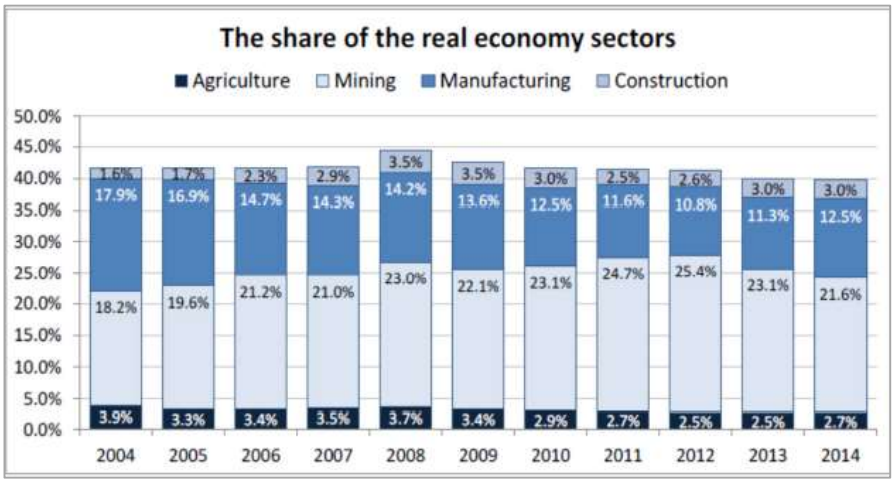


Figure 37: Mpumalanga GVA – 2014

The economy of Msukaligwa Municipality is predominantly based on coal mining, agriculture, forestry and timber processing. The municipality hosts Eskom's Camden power station which is fed by surrounding coal mines stretching from Albert Luthuli Municipality and coal haulage is being transported by road from the different mines. Coal haulage/transportation is also contributing meaningfully in terms of employment and support of local businesses (Msukaligwa IDP 2017-2022)

According to Census 2011, 41 698 are employed whereas 5 311 are discouraged work-seekers. The unemployment rate is 26,8%. There are 15 267 unemployed people. Of the youth aged 15–34, 20 261 are employed while 10 679 are unemployed.

Over 12% of the population do not receive an income whilst up to 20.9% receive and income between R19,601 - R38,200

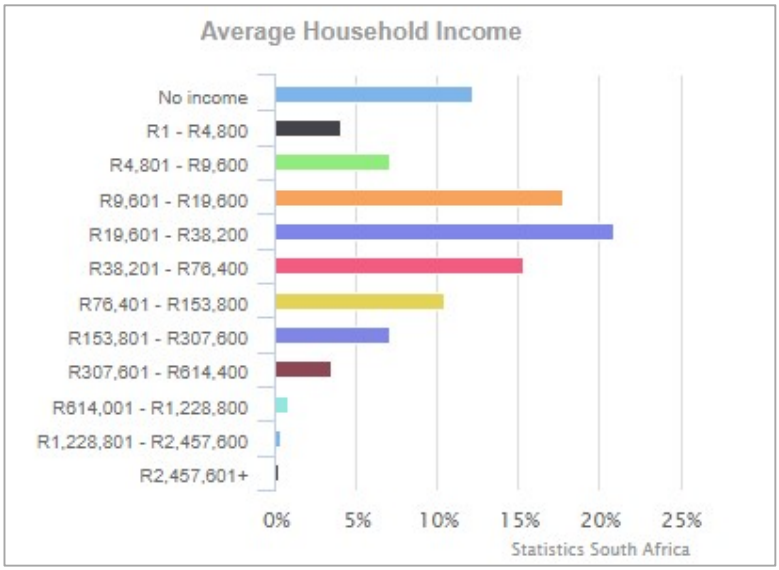


Figure 38: Average Household Income

- **Sensitives**

The Zikalala farmstead is located on Kalabasfontein 232 IS farm. The Zikalala family (total of 36 people) was on the farm when the current owners bought it in the year 2000. One of the family members, aged around 50, have been living on the farm since childhood. The family has indicated that they would not be opposed to moving, given that they would be allowed to continue farming on a different piece of land which will allow sufficient space for their cattle, sheep and goats to graze. The family has small vegetable garden for the use of the family and does not use the land for crop production.

Although the construction of the proposed project poses no social fatal flaws, and even though most of the anticipated impacts can be mitigated without resulting in any major social consequences, the proposed project forms part of a larger, all-inclusive environment.

Figure 39: Zikalala household located on Kalabasfontein 232 IS

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

- Close proximity of NFPA wetlands
- Sensitive ecological landscapes associated with the NFEPA wetlands
- Grave sites (2) and a palaeontological sensitive area associated with one of the grave sites
- The Zikalala farmstead is located on Kalabasfontein 232 IS farm

c. Environmental and current land use map.

(Show all environmental, and current land use features)

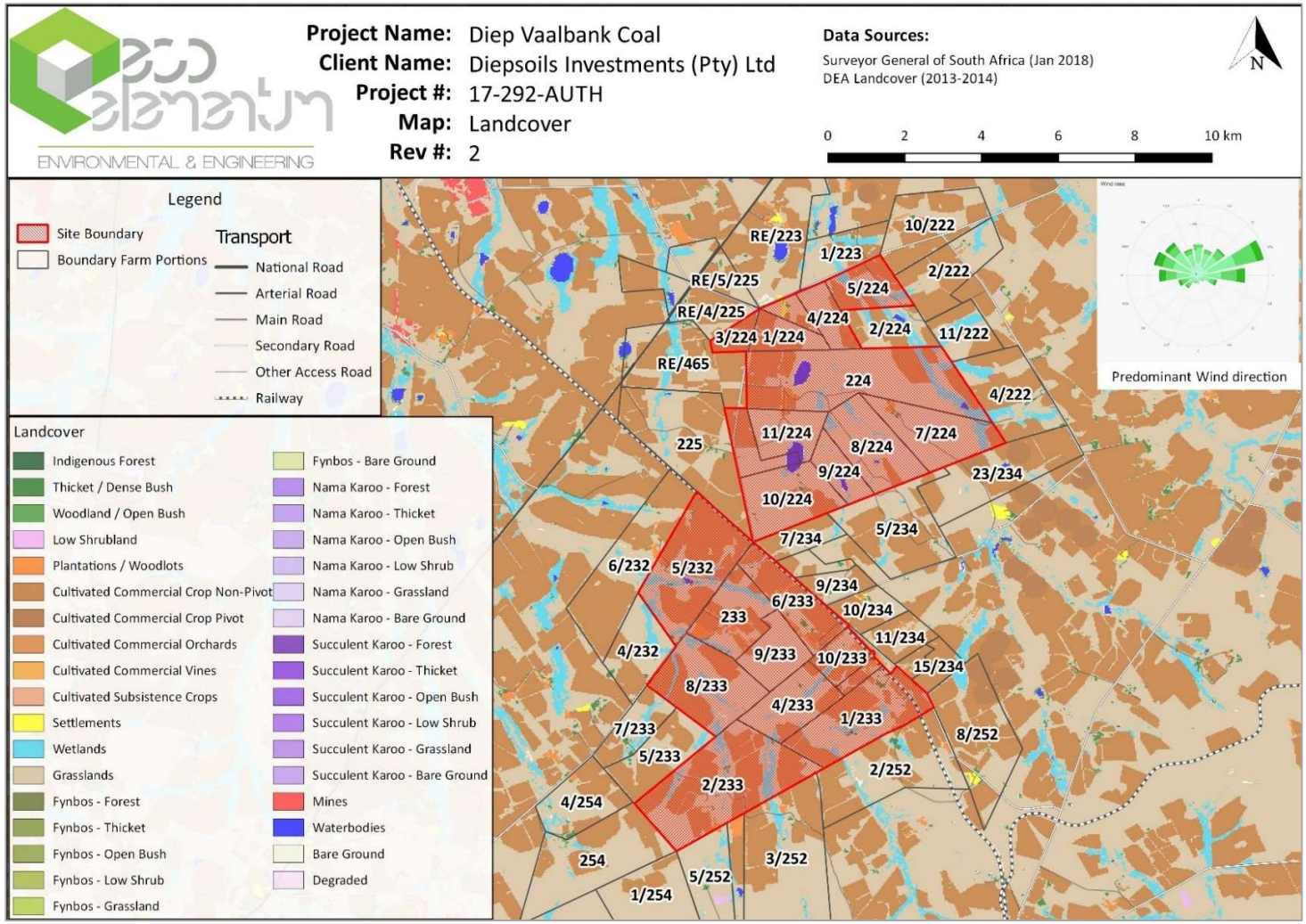


Figure 40: Landcover Map

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

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Refer to Section j below

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).

The assessment and evaluation of environmental impacts is often complicated by the subjective nature of these impacts. Ideally, the degree of severity or significance of a particular impact should be expressed in quantitative terms, against a quantitative assessment of the conditions that pertained before a particular activity started. There must also be some expression as to whether a particular impact is desirable or not, as the desirability of an impact will depend largely on the attitude and experience of the assessment team, subjectivity is unavoidable. In order to address these issues and to provide a basis for comparison of the different impacts associated with the activities, a number of standard definitions and approaches will be used.

Procedure for Impact Assessment Methodology

For the purpose of assessing impacts of the proposed project has been divided into the following two phases:

Table 15: Impact Phases

Construction Phase:	All the construction related activities on site, until the contractor leaves the site. Estimated to take 7 months
Operational Phase:	All activities, including the operation and maintenance of the proposed development. Life of Mine is planned for 20 years
Decommissioning & Mine Closure	Mine closure is the period of time when the ore-extracting activities of a mine have ceased and final decommissioning and mine reclamation is being completed

Impact Rating Assessment Approach

The activities arising from each of these phases were included in the impact assessment tables. This was done in order to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The assessment of the impacts were conducted according to a synthesis of criteria as set out below:

Assessment Weighting – Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it will be necessary to weigh and rank all the identified criteria.

Ranking, Weighting and Scaling – For each impact under scrutiny, a scaled weighting factor will be attached to each respective impact. The purpose of assigning such weightings serve to highlight those aspects considered the most critical to

the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

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 (Refer to the Figure below).

Cumulative Impacts Assessment Approach

Cumulative impacts can arise from one or more activities. A cumulative impact may result in an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts). Possible cumulative impacts of the development were evaluated.

Steps in Assessing Cumulative Impacts

Three (3) general steps, which are discussed below, were utilised in the assessment of cumulative impacts.

Determining the Extent of Cumulative Impacts

- To initiate the process of assessing cumulative impacts, it is necessary to determine what the extent of potential cumulative impacts will be. This will be done by adopting the following approach:
- Identify potentially significant cumulative impacts associated with the proposed activity;
- Establish the geographic scope of the assessment;
- Identify other activities affecting the environmental resources of the area; and
- Define the goals of the assessment.

Describing the Affected Environment

The following approach was used for the compilation of a description of the environment:

- Characterise the identified external environmental resources in terms of their response to change and capacity to withstand stress;
- Characterise the stresses affecting these environmental resources and their relation to regulatory thresholds; and
- Define a baseline condition that provides a measuring point for the environmental resources that will be impacted on.

Assessment of Cumulative Impacts

The general methodology which was used for the assessment of cumulative impacts comprised of the following:

- An identification of the important cause-and-impact relationships between proposed activity and the environmental resources;
- A determination of the magnitude and significance of cumulative impacts; and
- The modification, or addition, of alternatives to avoid, minimize or mitigate significant cumulative impacts

Table 16: 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 the 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

(L)ow	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	**1**
LOW- MEDIUM	The affected environment is altered, but functions and processes continue, albeit in a modified way.	**3**
MEDIUM (M)	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.	**5**
MEDIUM-HIGH		
HIGH (H)		

Mitigation Measures

Mitigation measures were recommended in order 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 a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an "educated guess" based on his/ her 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		0.2
MEDIUM-HIGH		0.4
LOW TO MEDIUM		0.6
LOW		1

Table 17: 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 18: 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 19: 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.

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

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

- Objections have been raised by the landowner of the Farm Ruitkuil 224 (Portion 10) against the proposed mining development on this property. Alternative 2 is thereby not preferred in terms of his objection at this stage.

- Adjacent landowners of the farm Rietkuil Farm Ruitkuil 224 (Portion 10) have also raised concerns about the project which be in close proximity to their farms. They form part of the Rietkuil Beneficiary Group. Alternative 2 is therefor not preferred by the community.
- Mr. Kadish, the owner of the land on the preferred option (portion 5 of the Farm Kalabasfontein 232 IS), is seeing this proposed development as quite a positive in terms of economic prosperity, socio-economic growth and employment opportunity for some of the communities in the area. This will also bring some financial and social relieve to the local communities.

The possible mitigation measures that could be applied and the level of risk.

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

Refer to Section j below (Alternative 1 and 2 impact assessment and mitigation measures

Motivation where no alternative sites were considered.

N/A

Statement motivating the alternative development location within the overall site. (Provide a statement motivating the final site layout that is proposed)

Based on the outcome of the impact assessment rating system, it becomes evident that Alternative 2 (mine infrastructure on Portion 10 of the Farm Rietkuil 224 IS) has potentially lower environmental impacts. This is predominately due to the fact that the site is not located within close proximity of a wetland or sensitive habitat. In terms of the heritage and archaeological findings, the alternative is however considered sensitive due to a settlement foundation that might be associated with the nearby identified graveyard (in close proximity of the mining footprint on the same property). This alternative (Alternative 2) is however deemed to be problematic from a socio-economic perspective, as the landowner (Mr Uys) has objected to the project due to economic factors including active farming practices and lease agreement agreed upon for the next 7 years. The Rietkuil beneficiary group has also raised concerns on Alternative 2.

Alternative 1 (Preferred site located on Portion 5 of the Farm Kalabasfontein 232 IS) infringes on a wetland buffer and is also associated with the crossing of hillslope seepage area. There is however an existing gravel road (used by the existing farming community) crossing this portion of the hillslope seepage which can be used and upgraded by ecological sensitive civil designs which enhances the current water flow capabilities. The wetland and surface water studies have delineated the wetland and imposed a 100m around the wetland area. *It is therefore recommended that a third alternative (Alternative 3) is considered whereby the mining footprint and layout is moved further to the west of the wetland area so as to be completely out of the buffer zone of the wetland and associated riparian zone.*

j) 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 were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

3.12 Impacts Associated With Environmental Aspects Of Alternative 1

Topography

Table 20: Topography Alteration Impact Rating Table

Impact source(s)	Levelling of the site		**Status**	Negative -
Nature of impact	Alteration of the natural topography of the site			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long term – 4		
	Probability	Highly Likely – 4		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5 + 4 + 4) x 3 = 45*		Medium
	With mitigation	WOM x ME = WM 45 x 0.4 = 18		Low

Table 21: Topography Alteration Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures

Construction	• Minimise the surface disturbance footprint of the Diep Vaalbank Coal Project
	• Manage Terrain Stability through the following
	  ○ Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures;
	  ○ Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and
	  ○ Using drainage control measures and culverts to manage the natural flow of surface runoff.
	• Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts will be installed to permit free drainage of existing water courses.

Operational	• Drains and intercept drains must be maintained so that they continue to redirect clean water away from the operating areas • Disturbed sites must be rehabilitated as soon as they have reached the end of their life. • Prevent erosion of existing water courses, particularly at clean stormwater system discharge points • Mitigation of flooding to neighbouring properties in the areas due to the proposed mine footprint and mining activities

	• Recreate habitats where possible or structure altered landscapes to be compatible with regional habitat mosaics to resist water and wind erosion of soils • Concurrent rehabilitation must be undertaken in a manner that supports the final closure landform in order to ensure that rehabilitation does not need to be redone at a later stage.
Closure & Decommissioning	• Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource • Undertake maintenance and aftercare of final rehabilitated land. Frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed • Stockpiles soils should be removed for rehabilitation and the site should be rehabilitated and sloped to original form

Soils

Applicable legislation applicable to environmental resources

- Soils and land capability are protected under the National Environmental Management Act 107 of 1998, the Minerals Act 28 of 2002 and the Conservation of Agricultural Resources Act 43 of 1983.
- The National Environmental Management Act 107 of 1998 requires that pollution and degradation of the environment be avoided, or, where it cannot be avoided be minimised and remedied.
- The Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal.
- The Conservation of Agriculture Resources Act 43 of 1983 requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.
- National Environmental Management: Waste Act (59 of 2008): Section 8 of Chapter 4 of the Act indicates the requirement to identify the status and risk of contaminated sites and provides a legal mechanism for remediation activities to be instigated and controlled.
    - The Waste Classification and Management Regulations require that (Chapter 2, 4(2)) all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within 180 days of generation and if the waste is to be disposed of to landfill that (Chapter 2 (8)1) (a) the waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal.
    - Waste Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits: The regulations specify design approach and considerations for Residue Stockpiles and Residue Deposit (RSRD), but more importantly specify that these facilities must comply with the National Norms and Standards for Waste.
    - Contamination because of the project activities will require remediation, with the final soil quality having to meet the requirements as specified in the Regulations.
    - The Waste Classification and Management Regulations and the supporting Norms and Standards as well as Regulations regarding the Planning and Management of Residue Deposits and Residue Stockpile do not contain specifications around rehabilitation, decommissioning and closure, other than the requirements in Regulations itself regarding the Planning and Management of Residue Deposits and Residue Stockpile - stockpiles and deposits be closed according to the relevant provisions in the environmental authorisations, an Environmental Management Plan/Programme and any other applicable legislation (such as the National Water Act for instance)

Table 22: Soil Erosion Impact Rating Table

Impact source(s)	• Loss of topsoil resulting in the reduction in soil quality which results from the loss of the nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. • Soil erosion is a permanent impact for once the resource has been lost from the landscape • Off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation.		**Status**	Negative
Nature of impact	• Erosion from mining activities including vehicular movement • Erosion from permanent road upgrades • Surface infrastructure like buildings, haul roads, waste rock dumps and product stockpiles are disruptive to current land uses, land capability as well as agricultural potential of the soil. Soil underneath buildings and stockpiles are subject to compaction and sterilization of the topsoil; and • Loading and hauling of coal at the product stockpiles and transporting it away from site.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 5) x 3 = 42*		Medium
	With mitigation	WOM x ME = WM 42 x 0.4 = 16.8		Low

Table 23: Soil Erosion Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• Minimise the surface disturbance footprint of the Diep Vaalbank Coal Project • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure phases with the following objectives: o Address the prevention, minimisation and management of erosion, compaction and chemical soil pollution during construction, operations, decommissioning and closure; o Describe soil stripping and stockpiling methods that will reduce the loss of topsoil; o Define requirements and procedures to guide the Project Management Team and other project contractors; o Define monitoring procedures. • Manage Terrain Stability through the following o Using appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; o Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and o Using drainage control measures and culverts to manage the natural flow of surface runoff.

	• Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts will be installed to permit free drainage of existing water courses. • All footprint areas should be clearly defined and demarcated and edge effects beyond these areas clearly defined. This measure will significantly reduce areas to be compacted by heavy construction vehicles and regular activities during the operational phase.
Operational	• All footprint areas should be clearly defined and demarcated and edge effects beyond these areas clearly defined • Existing established roads should be used wherever possible. Where possible, roads that will carry heavy-duty traffic should be designed in areas previously disturbed rather than clearing new areas, where possible • As part of the Soil Management Plan (SMP) objectives (for the construction phase) the following should be considered as well: o The vegetative (grass) cover on the soil stockpiles (berms) must be continually monitored in order to maintain a high basal cover. Such maintenance will limit soil erosion by both the mediums of water (runoff) and wind (dust). o Drains and intercept drains must be maintained so that they continue to redirect clean water away from the operating areas, and to convey any potentially polluted water to pollution control dams. • Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation • Wherever possible, stripping and replacing of soils should be done in a single action. This will reduce compaction and also increase the viability of the seed bank contained in the stripped surface soil horizons • To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum • Ensure all topsoil stockpiles are clearly and permanently demarcated and located in defined no-go areas. These areas should be maintained for rehabilitation purposes and topsoil should never be used as a filling material for ramps, etc. • Disturbed sites must be rehabilitated as soon as they have reached the end of their life. • Prevent erosion of existing water courses, particularly at clean stormwater system discharge points • Management of the terrain for stability by using the following measures will reduce the risk of erosion significantly: o Use appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; o Reduce slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and o Using drainage control measures and culverts to manage the natural flow of surface runoff. • Recreate habitats where possible or structure altered landscapes to be compatible with regional habitat mosaics to resist water and wind erosion of soils

	• Undertake concurrent rehabilitation techniques to prevent topsoil from being stockpiled too long and losing its inherent fertility depending on the limitations of the layout of the operation. Disturbed sites must be rehabilitated as soon as they have reached the end of their life • As new stockpiles are created, they should be re-vegetated immediately to prevent erosion and resulting soil losses from these stockpiles. It is recommended that vegetation removed during land clearance be composted during the operational phase and that this compost be used as a soil ameliorant for soil rehabilitation purposes.
Closure & Decommissioning	• Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource • Undertake maintenance and aftercare of final rehabilitated land. Frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed • All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site. • Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible

Table 24: Soil Contamination Impact Rating Table

Impact source(s)	• Soil chemical pollution as a result of potential oil and fuel spillages from vehicles • Processes associated with the storing, washing, loading and transporting of coals • Handling and storage of building materials and different kinds of waste.	**Status**	Negative
Nature of impact	• Oxidation of stockpiled coal and waste material: The storage of coal and waste rock, which can contain coaliferous material, can lead to the oxidation of metal-sulphide mineral surfaces and the production of acidic water depending on the acid base accounting of the material. During the oxidation process heavy metals and other problematic ions such as sodium and sulphate can be released (through mineral breakdown owing to mineral oxidation). If the acid to base ration of the coal and coaliferous waste is such that the ensuing leachate is acidic, a second step of heavy metal, sodium and sulphate mobilisation can occur, namely through mineral dissolution owing to acidic conditions. • Hydrocarbon contamination owing to vehicle and machinery breakdown or surface run-off from maintenance and wash bays can result in the contamination of soil and surface water. • Leaking of pollution control dams could have a severe negative impact on the soil and surface water body environment. Seepage from pollution control dams is a common occurrence on mines and leads to soil and water contamination which negatively impacts on the agricultural potential of the mining and post-mining landscape. • Malfunctioning sewage treatment facilitates: Spillage or leakage from sewage treatment facilities could lead to eutrophication of the surface water and salinization of soils.		
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓
Magnitude	**Extent**	Site – 2	

	Intensity	High – 5	
	Duration	Long Term - 4	
	Probability	Likely – 5	
Weighting Factor		Medium - 3	
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 4 + 5) x 3 = 60*	Medium- High
	With mitigation	WOM x ME = WM 60 x 0.4 = 22.4	Low-Medium

Table 25: Soil Contamination Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids. • The SMP must: o Address the prevention, minimisation and management of erosion, compaction and chemical soil pollution during construction, operations, decommissioning and closure; o Define requirements and procedures to guide the Project Management Team and other project contractors; o Define monitoring procedures
Operational	• Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately. • Stockpiles must be managed so they do not become contaminated and then need additional handling or disposal; • A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; • Processing areas should be contained and systems designed to effectively manage and dispose of contained storm water, effluent and solids; • Storage tanks of fuels, oils or other chemicals should be stored above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. • Storage tanks of fuels, oils or other chemicals must be bunded by 110% to mitigate for unforeseen accidents and spillages;. • Above-ground (rather than in-ground) piping systems should be provided. Containment bunds should be sealed to prevent spills contaminating the soil and groundwater; • Equipment, and vehicle maintenance and washdown areas, must be contained and appropriate means provided for treating and disposing of liquids and solids; • Air pollution control systems will help avoid release of fines to the ground (such as dust from dust collectors or slurry from scrubbing systems); • Solids and slurries should be disposed of in a manner consistent with the nature of the material and avoids contamination; and • Effluent and processing drainage systems must be installed to avoid leakage to ground

Closure & Decommissioning	• Chemical soil pollution should be minimised as follows: o Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material o Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; o Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; o Containing potentially contaminating fluids and other wastes; and o Cleaning up areas of spillage of potentially contaminating liquids and solids. o Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;

Table 26: Land Capability Impact Table

Impact source(s)	Land clearance, vegetation removal, mining infrastructure and mining operations activities changing the final land capability			**Status**	Negative
Nature of impact	Soil chemical pollution, Loss of topsoil, Soil compaction,				
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓		
Magnitude	**Extent**	Site – 2			
	Intensity	High – 5			
	Duration	Long Term - 4			
	Probability	Definite – 5			
Weighting Factor		Medium – High - 4			
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 4 + 5) x 4 = 64*			Medium- High
	With mitigation	WOM x ME = WM 60 x 0.6 = 38.4			Medium

Table 27: Land Capability Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• Minimise the surface disturbance footprint of the project • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure phases with the following objectives: o Address the prevention, minimisation and management of erosion, compaction and chemical soil pollution during construction, operations, decommissioning and closure; o Describe soil stripping and stockpiling methods that will reduce the loss of topsoil; o Define requirements and procedures to guide the Project Management Team and other project contractors; o Define monitoring procedures.
Operational	• As part of the Soil Management Plan (SMP) objectives (for the construction phase) the following should be considered as well: o The vegetative (grass) cover on the soil stockpiles (berms) must be continually monitored in order to maintain a high basal cover. Such maintenance will limit soil erosion by both the mediums of water (runoff) and wind (dust). o Drains and intercept drains must be maintained so that they continue to redirect clean water away from the operating areas, and to convey any potentially polluted water to pollution control dams.

Closure & Decommissioning	• Land rehabilitation should at least aim to restore the areas disturbed to a grazing capacity of 5 to 6 ha/LSU or even better. • Closure phase to include the maintenance and aftercare of final rehabilitated land. In this regard, frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed. In the event that vegetation has not re-established and erosion gullies have developed, remedial action should be taken • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource • Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible

Surface Water

Applicable legislation applicable to environmental resources

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- The National Water Act, Act 36 of 1998
- The National Water Resources Strategy (DWS, 2013)
- South African Water Quality Guidelines
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
- Environment Management Act: Protected Areas Act, 2003 (Act No. 57 of 2003
- National Heritage Resources Act, 1999 (Act No. 25 of 1999)

Table 28: Alteration of Surface Water Resources

<table>
<tr><td>Activity</td><td colspan="3">Potential Alteration of Physical and Chemical Properties due to:

• Coal Mining & Related Activities in close proximity to wetland
• Removal of soil in wetland and riparian areas
• Discharge of stormwater to Olifants River
• Cone of depression formed due to coal mining and altering base flow to wetland
• Construction of an access road through the Hillslope wetland
• Alternation of natural drainage patterns of the catchment (Including the negative effects on that specific aquatic feature as well as knock-on effect (indirect impacts) on the riparian vegetation and aquatic invertebrates within such a system).
• Interception of watercourse and drainage areas by the infrastructure associated with the Diep Vaalbank Coal Mine;
• Reduction of base flow feeding the wetland caused by a drawdown cone resulting from mining;
• Increased stormwater runoff from the affected footprint area due to hardened surfaces, roads, and areas of cleared vegetation; and
• Accidental spillage or discharge from pollution control facilities
• Pollution generated from human and other general waste generated entering the surface water resources</td><td>Status</td><td>Negative</td></tr>
<tr><td>Impact of Activity</td><td colspan="4">• Compaction of the soils not being excavated due to mining activities in close proximity of the wetland
• Potential hydrocarbon spills impacting the water resource due to mining activities in close proximity of the wetland
• Destruction of Riparian Vegetation due to mining activities in close proximity of the wetland
• Reduced Soil functionality and additional siltation within the watercourse due to removal of soil in wetland and riparian areas
• Reduced Water quality and erosion, bank destabilisation and siltation within the watercourse due to Discharge of stormwater to Olifants River
• Reduced base flow to wetland system and decreased Groundwater quality resulting from cone of depression formed due to coal mining and altering base flow to wetland
• Vegetation degradation and reduced wetland functionality due to the construction of an access road through a Hillslope Seepage</td></tr>
<tr><td>Project Phase</td><td>Construction
✓</td><td>Operational
✓</td><td colspan="2">Closure and Decommissioning
✓</td></tr>
<tr><td rowspan="4">Magnitude</td><td>Extent</td><td colspan="3">Regional – 3</td></tr>
<tr><td>Intensity</td><td colspan="3">High – 5</td></tr>
<tr><td>Duration</td><td colspan="3">Long Term - 4</td></tr>
<tr><td>Probability</td><td colspan="3">Highly Likely - 4</td></tr>
<tr><td colspan="2">Weighting Factor</td><td colspan="3">High - 5</td></tr>
<tr><td rowspan="2">Significance</td><td>Without mitigation</td><td colspan="2">(Extent + Intensity + Duration + Probability) x WF
(3 + 5 + 4 + 4) x 5 = 80</td><td>High</td></tr>
<tr><td>With mitigation</td><td colspan="2">WOM x ME = WM
80 x 0.6 = 48</td><td>Medium</td></tr>
</table>

Table 29: Surface Water Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures

Construction	• A water use license authorisation in terms of section 39 or 40 of the National Water Act, 1998 (Act No. 36 of 1998) for the Section 21(c) and (i) uses must be applied for (approval is needed prior to the undertaking of any activities related to the wetland areas) • In terms of Section 40 of the National Water Act, 1998 (Act No. 36 of 1998), a WULA and Environmental Risk Assessment (ERA) must be submitted for all activities within 500 m of a wetland • Maintain a minimum of a 100 m buffer zone around the wetland areas wherein no surface mining or related activities are allowed to take place. (Figure 41) • This buffer zone should be clearly demarcated as a "NO GO" area to prevent any accidental entrance into the area • Undermining can be considered pending the outcome of the Geotechnical Assessment. • Minimise the surface disturbance footprint of the Diep Vaalbank Coal Project • All affected areas must be air rated by means of ripping or ploughing and re-vegetated asap. • An ecological sensitive stormwater management plan should be implemented • Storm water needs to adhere to RQO's, none acidic and treated prior to discharge • Storm water to be contained or augmented in bio retention pond prior to outlet to the wetland system • Storm water diversion must take place upstream of the site should form part of the SWMP • Stream-bank at dam spillway and downstream of dam to be well protected against flood damage and erosion • Storm-water management practices must be applied and incorporated into management with the aid of a suitably qualified engineer to avoid disposal or spillage of any environmentally harmful materials or waste into the wetland. • Construction should also be undertaken during the dry season. • All no-go areas must be demarcated and the ECO on site should ensure that any spills are immediately reported and cleaned. Furthermore, all machines should be properly maintained and drip trays are to be placed under all equipment over night or when not working. • Riparian areas must be demarcated and protected as far as possible and if impacted, it must be rehabilitated before the wet season. • Impacted wetland systems earmarked for mining to be replaced with offset strategy • Wetland crossing to be designed by a civil engineer. The plan should cater for specie migration, ensure that flooding doesn't lead to erosion • A Plant Species Plan will ensure that Alien Invasive Species are controlled all while the promotion of endemic species taking place. • Wetland Functionality will have to be monitored on a continuous basis to ensure that no degradation takes place. A Rehabilitation Plan will need to be drafted and implemented in an attempt to ensure no impact is allowed to manifest in the areas • Disturbed areas must be effectively managed to prevent deep gully incisions that eventually contributes towards soil erosion problems. • Prepare an appropriate wetland management plan which include rehabilitation strategies for the LOM • A Zero effluent discharge policy (no discharge to dam or stream) is required • Strict regulatory control on all water containing waste generated and disposal of effluent (from the sewerage treatment plant on site)

Operational	• Rehabilitate degraded areas, including the re-establishing of biodiversity and the restoration of key processes. • Maintain physical, chemical and biological processes in freshwater wetland areas. • Control and where possible eliminate alien/invasive biota to facilitate re-establishment of natural biodiversity pattern and process in invaded areas. • Strive towards re-establishment of biodiversity patterns and process in degraded land. • Remove alien vegetation in freshwater wetland areas. • Prevent or minimise development within freshwater wetlands. • Establish the distribution and density of invasive species. • Prioritise areas for alien removal focusing on biodiversity restoration. • Implement removal programs for priority species and areas (alien plants, mobile dunes). • Investigate options for the control of alien species (e.g. biological control). • Encourage and facilitate natural recovery of transformed areas • Dirty water to be collected at the station drains and sumps • Clean water diversion (bunds/ canals) to be implemented. • Good housekeeping (clean-up of spills and minimise informal storage of materials) • Leak detection through inspection • Good housekeeping (maintenance of equipment) • Storm water diversion upstream of the facilities should form part of the SWMP • Either run off will be contained in paddocks for collection and evaporation or run off will be captured in the drain system and channelled to the PCD compartment. • Monitor seepage at PCD on a quarterly basis • Isolate pollution sources with roofs, concrete bases, traps, sumps and bund walls (e.g. diesel/petrol storage, wash bays and workshops) • Roads should be surfaced or sealed with a biodegradable product • Vehicle maintenance must be conducted on bunded concrete surfaces

Closure & Decommissioning	• Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Undertake maintenance and aftercare of final rehabilitated land. Frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed • All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site. • Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible

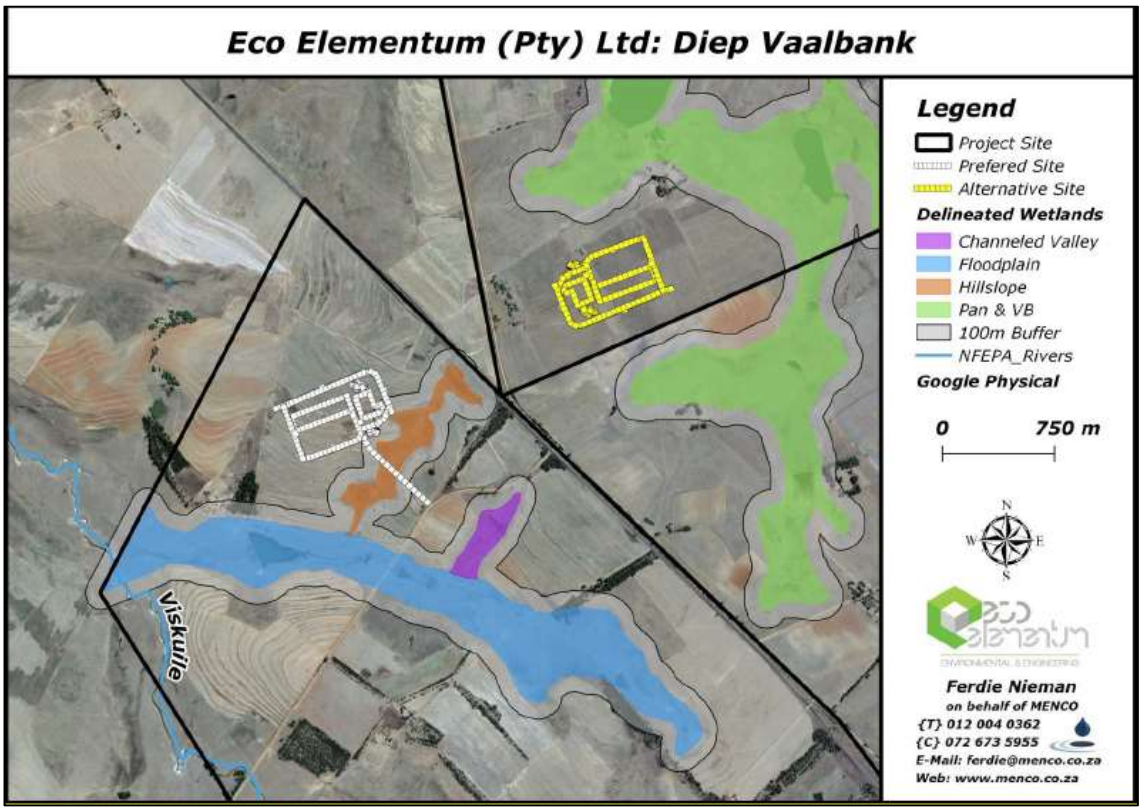


Figure 41: Wetland 100m Buffer Zone

Groundwater

Applicable legislation applicable to environmental resources

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- The National Water Act, Act 36 of 1998
- The National Water Resources Strategy (DWS, 2013)
- South African Water Quality Guidelines
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
- Department of Water Affairs and Forestry (DWAF). (1998). Minimum Requirements for the Water Monitoring at Waste Management Facilities. CTP Book Printers. Cape Town

Figure 42: Groundwater Impact Rating Table (Construction)

Impact source(s)	• Dewatering of water through:
	• Dewatering
	  ○ Underground mining area
	• Transport
	  ○ Plant area
	  ○ Unwashed product stockpiles
	  ○ Overburden dump
	  ○ Current Stockpiles
	  ○ Return Water Dams
	• During mining any contaminants will move along the groundwater gradient towards the underground.
			Status	Negative

Nature of impact	• Impact on groundwater quality • Impact on groundwater quantity			
Project Phase	Construction ✓	Operational	Closure and Decommissioning	
Magnitude	**Extent**	Regional – 3		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Highly Likely – 4		
Weighting Factor		Medium - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 3 + 4 + 4) x 4 = 56*		Medium
	With mitigation	WOM x ME = WM 56 x 0.4 = 22.4		Low-Medium

Table 30: Groundwater Impact Rating Table (Operation)

Impact source(s)	• Dewatering the groundwater resource and; • Contamination through ARD processes		**Status**	Negative
Nature of impact	• Lowering of groundwater table: • Impact on water supply of groundwater users surrounding the mine • Potential impact on base flow of streams and wetland systems			
Project Phase	Construction	Operational ✓	Closure and Decommissioning	
Magnitude	**Extent**	Regional – 3		
	Intensity	High – 5		

	Duration	Long Term - 4	
	Probability	Likely – 3	
Weighting Factor		Medium - 4	
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 5+ 4+ 3) x 4 = 60*	Medium - High
	With mitigation	WOM x ME = WM 60 x 0.6 = 36	Low-Medium

Table 31:Groundwater Impact Rating Table (Closure and Decommissioning)

Impact source(s)	• Groundwater rebound following the mine closure and termination of dewatering			**Status**	Negative
Nature of impact	• As some discards and exposed reactive mineral surfaces will remain in the mine, this outflow could be contaminated as a result of acid mine drainage. • The leachate plume emanating from the mine may impact on the wetlands, streams and groundwater				
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓		
Magnitude	**Extent**	Regional – 3			
	Intensity	High – 5			
	Duration	Long Term - 4			
	Probability	Likely – 3			
Weighting Factor		Low-Medium -2			
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 5 + 4 + 3) x 2 = 30*			Low-Medium
	With mitigation	WOM x ME = WM 30 x 0.6 = 18			LOW

Project Phase	**Mitigation and Management Measures**

Construction	• Before operation, a plan that includes explicit consideration of closure and rehabilitation issues must be prepared and approved. These plans should define the sequence and nature of operations and detail the methods to be used in closure and restoration. The plans as well as the numerical should be updated regularly (every 3 to 5 years) during operation with available monitoring data. • All operational planning and activities should be undertaken with eventual closure in mind, such that operations can end in a manner that minimizes the final risks and liabilities in the post-closure phase. • Water management facilities should be designed to intercept and contain as much contaminated runoff and/or seepage as possible. The following facilities should be lined: o Return Water Dam o Pollution Control Dam • Apply effective storm water management principles to ensure that clean runoff is maximised and diverted to the receiving water resource, while contaminated runoff is minimised and contained for reuse within the operation. • Apply passive water management measures within the operations that are aimed at minimising the potential for water quality deterioration due to the oxidation of sulphide minerals by reducing the available contact time between water and exposed sulphide minerals. • Monitoring boreholes as discussed in the following sections will be required in strategic locations near the pollution source, to obtain information on the groundwater regime as well as for future monitoring purposes. • Construct detailed water and salt balances that take account of climatic and operational variability, as a planning tool to ensure that all pollution control dams are adequately sized and that they are integrated into a robust water reuse and reclamation strategy to ensure that captured contaminated water is effectively reused within the mining operations and that system spillages to the environment are avoided. • Proper storage, handling and monitoring of fuel and chemicals used on site to minimize the risk of spillages to the environment. • Institute detailed monitoring systems that are capable of detecting pollution at the earliest possible stage, at all facilities where significant pollution potential exists, in order that this can lead to rapid and effective management actions to address the pollution source and minimize it to the full extent possible. • Safety measures such as freeboard allowances etc. should be included in designs of storm water control facilities to allow for sufficient storage capacity and to ensure that risks of overflows or spillages are minimized and environmental impacts are therefore avoided. • Design, construct, maintain and operate any clean water system at the mine or activity so that it is not likely to spill into any dirty water system more than once in 50 years; • Design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years; • Design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years. • Design and operate the MRDs to minimise the evaporative losses, e.g. by limiting the size of the supernatant pool on the MRD surface.

Operational	• Identify and where possible, maximise areas of the mine that will result in clean storm water runoff (for example open veld areas) as well as infrastructure associated with the mine (for example office areas) and ensure that runoff from these areas is routed directly to natural watercourses and not contained or contaminated. • Ensure that clean storm water is only contained if the volume of the runoff poses a risk, if the water cannot be discharged to watercourses by gravitation, for attenuation purposes, or when the clean area is small and located within a large dirty area. This contained clean water should then be released into natural watercourses under controlled conditions. • Ensure the minimisation of contaminated areas, reuse of dirty water wherever possible and planning to ensure that clean areas are not lost to the catchment unnecessarily. • Ensure that seepage losses from storage facilities (such as polluted dams) are minimised and overflows are prevented. • Ensure that all possible sources of dirty water have been identified and that appropriate collection and containment systems have been implemented and that these do not result in further unnecessary water quality deterioration. • Ensure that less polluted water or that: moderately polluted water is not further polluted. Where possible less and more polluted water should be separated. This will assist in the reuse water strategy and improve possibilities for reuse based on different water quality requirements by different mine water uses. • Where contaminants are transported along construction roads, emergency containment and mitigation measures must be developed to minimize impacts should accidental spillages occur along the transport routes. • Store all potential sources of contamination in secure facilities with appropriate Storm Water management systems in place to ensure that contaminants are not released to the water resource through Storm Water runoff. • Separate and collect all storm water that has a quality potentially poorer than the water quality specified and negotiated for the specific catchment into dirty water storage facilities for reuse within the mining operations. • Ensure that all storm water structures that are designed to keep dirty and clean water separate can accommodate a defined precipitation event. (The magnitude of the precipitation event used in such an objective statement must, as a minimum, adhere to the relevant legal requirements.) • Route all clean storm water directly to natural watercourses without increasing the risk of a negative impact on safety and infrastructure, e.g. loss of life or damage to property due to an increase in the peak runoff flow. • Ensure that the maximum volume of clean water runoff is diverted directly to watercourses and the minimum amount of storm water reports to the pit floor of an open cast mine. • Develop and implement proper environmental management and auditing systems to ensure that pollution prevention and impact minimisation plans and measures developed in the design and feasibility stages are fully implemented. • The size of unrehabilitated areas (pit, spoils, unvegetated areas) that produce contaminated runoff should be minimised. • Rehabilitation should be planned to promote free drainage and to minimise or eliminate ponding of storm water. On-going rehabilitation as mining operations progress is required. • The clean and dirty water flow areas on a mine site should be identified.

	• Every effort should be made to maximise the clean area and minimise the dirty area when locating the diversion berms, channels and dams. In the case of a new mine, the maximisation of the clean areas should have an influence in overall mine planning and the location of the mine infrastructure • The mine planning should consider concurrent rehabilitation of mine workings and waste management facilities, to maximise the areas of clean runoff that can be discharged to the natural watercourses • **Waste rock and PCD areas should incorporate the following:** o Monitoring of water storage facilities, particularly pollution control dams, is imperative to manage the risk of spillage from the dams. Stage-storage (elevation-capacity) curves are useful tools to monitor the remaining capacity within a water storage facility. o Prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain material or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources. o Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations and as feedback to stakeholders in the catchment, perhaps via the CMA. • Water that has been in contact with residue, and must therefore be considered polluted, must be kept within the confines of the MRD until evaporated, treated to rendered acceptable for release, or re-used in some other way. • All water that falls within the catchment area of the MRD must be retained within that area. For most MRDs the catchment can be divided into component catchments, as follows: • The top area of the MRD together with any return water storage dams which have been connected to the top area of the MRD by means of an outfall penstock, and • The faces of the MRD together with the catchment paddocks provided to receive run-off from the faces and any additional catchment dams associated with the faces and catchment paddocks. • The design, operation and closure of MRDs should incorporate consideration of the risk of changes in the mining and plant operations, and hence the mine water balance, through the life cycle of the mine. • A system of storm water drains must be designed and constructed to ensure that all water that falls outside the area of the MRD is diverted clear of the deposit. Provision must be made for the maximum precipitation to be expected over a period of 24 hours with a probability of once in one hundred years. A freeboard of at least 0.5 m must be provided throughout the system above the predicted maximum water level. This requirement applies to all MRDs, both fine and coarse-grained MRDs. • Ensure that the water use practices on and around the MRD do not result in unnecessary water quality deterioration, e.g. use of the return water dam for storage of poorer quality water. • Should the above be insufficient to capture polluted surface and groundwater moving towards the streams an interception trench can be designed as follows: • The depth of the trench should be at least 4 mbgl (or 2 m below the groundwater level) to intercept polluted seepage that resulted from the WRD; • The design of the trench gradient must be such that the water is free-flowing without eroding the channel; • The water from the trench must be captured, retained and managed within the mine water systems. • **Underground mining workings should include the following:**

	• All openings to the mine need to be sealed or have adequate berms surrounding the openings to prevent surface water entering. • All boreholes should be sealed from the bottom to the top to prevent groundwater entering the hole and feeding into the mine workings. • All depressions created by mining need to be profiled for self-drainage of surface water away from the workings. • Should depressions created by mining not be able to be filled, then the areas need to be surrounded by berms to prevent surface water ingressing the mine workings. • Where significant water ingress cannot be prevented, measures should be put in place to intercept ingress water as close as possible to the source in order that it can be pumped out of the mine before its quality can deteriorate through contact with sulphide minerals. • Properly mark all significant water ingress points encountered during mine construction and development and ensure that their physical location, flowrate and water quality are recorded and incorporated into the existing groundwater model and the mine water and salt balance. • Properly seal all major water ingress points and ensure that the details of the sealing operation are recorded. • Ensure that all approved design measures are properly implemented and modify mine plans and drawings to indicate 'as-built' systems wherever they deviate from the original designs, together with motivations on the design variation. • Institute appropriate water level and water quality monitoring programmes to confirm rate of water rise and water quality as the mine floods. Maintain an ability to access the underground workings until long term discharge and quality predictions have been confirmed. • A particular concern when storing water underground where it is likely to be in contact with sulphide minerals is to manage the storage systems in a manner that absolutely minimizes the potential for water quality deterioration to occur. This would imply that storage reservoirs must be filled as quickly as possible and that measures must be put in place to prevent regular fluctuation of the stored water level as it is this wetting and drying cycle on the exposed surfaces that will enhance the rate of sulphide oxidation and lead to water quality deterioration. • Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations and as feedback to stakeholders in the catchment, perhaps via the CMA. See the Monitoring Network section. • Areas that may have subsided or areas of depressions and/or sinkholes should be filled to create free draining surfaces. • Geochemical samples should be collected from the proposed stockpile and waste rock dump once in operation • The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts • A detailed mine closure plan should be prepared during the operational phase, including a risk assessment, water resource impact prediction etc. as stipulated in the DWA Best Practice Guidelines. • All sulphate containing waste material should be stored at the base of the underground mine and flooded as soon as possible to exclude oxygen. • Major underground fractures encountered while mining must be sealed by grouting, both on inflow and outflow areas

Closure & Decommissioning	• Potentially contaminated mine water discharge should be captured using a pollution control dam. • Water quantity and quality data should be collected on a regular, ongoing basis during closure and decommissioning • The implementation of the mine closure plan, and the application for the closure certificate can be conducted during the decommissioned phase

Vegetation (Flora) and Animals (Fauna)

Applicable legislation applicable to environmental resources

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- South African Water Quality Guidelines
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
- Department of Water Affairs and Forestry (DWAF). (1998). Minimum Requirements for the Water Monitoring at Waste Management Facilities. CTP Book Printers. Cape Town
- CITES;
- IUCN Red Data List;
- SANBI Red List of South African Plants;
- List of Protected Trees - National Forests Act, 1998 (Act No. 84 of 1998); and
- ToPS List – Government Gazette Notice No. 389 of 2013: "Publication of Lists of species that are Threatened or Protected, Activities that are prohibited and Exemption from Restriction", National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004).
- Mpumulanga Biodiveristy Spatial Plan
- Animals Protection Act, 1962 (Act No. 71 of 1962

Table 32: Vegetation disturbance Impact Rating Table

Impact source(s)	• Site preparation, removal of vegetation and topsoil before mining starts • Infringement of riparian zone and sensitive areas • Damage caused by staff and contractors if allowed to access certain natural areas (no-go areas) • Dust pollution		**Status**	Negative
Nature of impact	• The construction phase will have the most impact on plant communities with the removal of plant species and clearing of spaces. • Managing invasive plant species that increase during the operational phase of the project is an ongoing process and if not managed regularly could result in severe changes and competition in plant communities. • The topsoil that is removed may become spoilt and/or infertile making the replacement of the soil an ineffective process. The topsoil (A-zone) may also be stored together with the remainder of the soil removed making the replacement of topsoil unfeasible. • Without proper knowledge and/or mitigation measures. Endemic and/or vulnerable species that could possibly occur within the area of construction could be destroyed. • Flora could be damaged by staff and contractors if they are allowed to access certain natural areas that should be indicated as no-go zones. • Dust pollution could occur and could be severe if the necessary dust suppression mechanisms are not in place. • Most of the impacts on plant species will occur during the construction- and operational phases. Once the operation has been decommissioned, final steps in the rehabilitation process will take place. It is, however, possible that the rehabilitation plans are not feasible or only implemented and planned at a later stage than planned, hindering successful rehabilitation			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5 + 4 + 5) x 3 = 48*		Medium
	With mitigation	WOM x ME = WM 48 x 0.6 = 28.8		Low-Medium

Table 33: Vegetation Impact Management and Mitigation Measurements

Project Phase	Mitigation and Management Measures

Construction	• Minimise the surface disturbance footprint of the project • Sensitive areas and areas not included in the mining boundary should be cordoned off • Human activities should be kept out of the natural areas and animals prevented from entering the operation. A control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. Ensure awareness among staff, and management systems should be set in place to prevent any form of additional disturbance from occurring. • Ensure that animals are not trapped in excavations by regularly checking these and removing animals found to a save environment, this includes snakes. Close monitoring of animal communities to ensure that biodiversity is restored and self-sustaining. Reports on this should be written annually and be made available at all times. • A management plan needs to be implemented for the relocation of endangered (or any) faunal life that need to be relocated, in an ongoing process until end of closure phase. • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure phases • A biodiversity monitoring plan should be implemented prior to mining commencing • It is recommended that large trees are marked prior to clearing to ensure they are not damaged.
Operational	• Seasonal visual assessment of areas to determine if vegetation in undisturbed areas is being impacted. • A biodiversity baseline assessment should be conducted. Once this data is available, annual biodiversity monitoring of areas both affected and unaffected by activities should be initiated to determine the annual fluctuation in species numbers and, if necessary, relate this to activities on site. To his effect, a Biodiversity Action Plan (BAP) is highly recommended • Continue with alien invasive monitoring, eradication and control programme. • Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase. • Rehabilitation should take place concurrently with the prospecting and mining activities. Close monitoring of plant communities should be done to ensure that ecological balance is restored and the environment is self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary

Closure & Decommissioning	• A management plan for control of invasive/exotic plant species needs to be implemented. This will be ongoing until the end of the mining closure phase. The mine will be held accountable in this regard. • Rehabilitation of degraded areas is a must • Rehabilitation plan should be implemented. This includes the return of the topsoil and the process of replanting the vegetation. The replacement of the topsoil should be done with the assistance of a soil scientist. Topsoil should be tested closer to the rehabilitation phase to ensure that the soil is of an adequate quality. The post-closure rehabilitation plans should be adopted according to the necessary actions needed during the final stage of the life of mine. • The use of the farm post-closure should be grazing. The veld management plant that was created by the veld management expert should be thoroughly implemented. • Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted every six months by the environmental practitioner. A report should be written and stored to be made available and should be available at all times.

Animals (Fauna)

Table 34: Faunal Displacement Impact Rating Table

Impact source(s)	• Site preparation, removal of vegetation and topsoil before mining starts • Infringement of riparian zone and sensitive areas • Damage caused by staff and contractors if allowed to access certain natural areas (no-go areas) • Dust and noise pollution • Soil erosion • Off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation • Continued effects of haul roads and vehicle traffic on mammal movement	**Status**	Negative
Nature of impact	• The removal of vegetation areas will result in the destruction of microhabitats and burrows of animals. It might also result in the disturbance of sensitive animal species. This will lead to increases in inter- and intra-specific competition between species for the remaining habitats and food. The result is the out-competing of individuals and certain species if the habitat is not totally destroyed. • Noises during the operational phase due to the operation of the kilns and associated activities will result in a less favourable habitat for species and several communities may seek other more favourable areas to inhabit. • Certain animal species have specific foraging and breeding ground needs. Erecting fences around areas and other activities in the foraging and breeding grounds of certain animals will affect the viability of the habitat that they may need to sustain themselves. • Anthropogenic influence stemming from workers that infiltrate/penetrate the natural veld areas will have a possibly damaging impact on species communities in the area. • The completion of the decommissioning process might recreate microhabitats and burrows that had been destroyed in the construction/operational phase. The impact is therefore seen as minimal and animals will start to inhabit areas that have been previously deemed uninhabitable due to activity and noises, if the area is rehabilitated correctly.		

Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	Extent	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium – High - 4		
Significance	Without mitigation	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5 + 4 + 5) x 4 = 64*		Medium-High
	With mitigation	WOM x ME = WM 64 x 0.6 = 38.4		Low-Medium

Table 35: Faunal Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• Minimise the surface disturbance footprint of the project • Sensitive areas and areas not included in the mining boundary should be cordoned off • Human activities should be kept out of the natural areas and animals prevented from entering the operation. A control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. • Employees and Contractors must be made aware of the Animals Protection Act, 1962 (Act No. 71 of 1962) as amended which deals with the prevention of animal cruelty. • Ensure that animals are not trapped in excavations by regularly checking these and removing animals found to a save environment, this includes snakes. Close monitoring of animal communities to ensure that biodiversity is restored and self-sustaining. Reports on this should be written annually and be made available at all times. • A management plan needs to be implemented for the relocation of endangered (or any) faunal life that need to be relocated, in an ongoing process until end of closure phase. • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure phases • A biodiversity baseline assessment should be conducted. Once this data is available, annual biodiversity monitoring (in line with the biodiversity monitoring plan) of areas both affected and unaffected by activities should be initiated to determine the annual fluctuation in species numbers and, if necessary, relate this to activities on site. To his effect, a Biodiversity Action Plan (BAP) is highly recommended • It is recommended that large trees are marked prior to clearing to ensure they are not damaged.

Operational	• Seasonal visual assessment of areas to determine if vegetation in undisturbed areas is being impacted. • Continue with alien invasive monitoring, eradication and control programme. • Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase. • Rehabilitation should take place concurrently with the prospecting and mining activities. • Close monitoring in terms of the biodiversity monitoring plan of plant communities should be done to ensure that ecological balance is restored and the environment is self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary

Closure & Decommissioning	• To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees. • Activities on site must comply with the regulations of the Animal Protection Act 1962 (Act No. 71 of 1962). Workers should also be advised on the penalties associated with the needless destruction of wildlife, as set out in this act. • Ensure that an acceptable aesthetic scenario is created post closure. This will be reached through adequate rehabilitation practices by restoring damaged and degraded habitat areas. • When closure is considered successful and rehabilitation complete, unnecessary fences should be lifted to restore larger foraging areas, especially for larger mammalian species within the area • A management plan for control of invasive/exotic plant species needs to be implemented. This will be ongoing until the end of the mining closure phase. The mine will be held accountable in this regard. • A rehabilitation plan should be implemented. This includes the return of the topsoil and the process of replanting the vegetation. It is recommended that the replacement of the topsoil is done with the assistance of a soil scientist. The topsoil should also be tested closer to the rehabilitation phase to ensure that the soil is of an adequate quality. The post-closure rehabilitation plans should be adopted according to the necessary actions needed during the final stage of the life of the mine. The focus of the rehabilitation plan would be to deliver the best overall environmental, economic and social outcomes. • Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted every six months by the environmental practitioner. A report should be written and stored to be made available and should be available at all times. • The use of the farm for conservation purposes post-closure of the mine is very low. Therefore, a possible use after rehabilitation would be to utilize it for grazing purposes. For grazing to be efficient, a veld management expert should be employed to develop a veld management programme for the area. This should be done long before rehabilitation is started, especially before the replacing of the soil, to ensure that an adequate and realistic programme is implemented. A possible method for reseeding should be to sow many pioneer species during the first process that will become established more easily. It will make the area suitable for other species to also become established. Therefore, a successional process should be followed. • Ensure awareness amongst all staff, contractors and visitors to the site to not needlessly damage flora. • Rehabilitate surrounding area with natural, indigenous vegetation as much as possible, consulting with specialists as to the most appropriate methods. • Re-vegetation of al degraded areas and bare patches is advised to speed recovery to natural, self-sustaining state as soon as possible

Air Quality

Applicable legislation applicable to environmental resources

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- National Environmental Management: Air Quality Act, Act No. 39 of 2004
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) - National Dust Control Regulations (Government Gazette No. 36794 - No. R 827)
- South African National Standard – Sans1929:2011

Table 36:Air Quality Impact Rating Table (Construction Phase)

Impact source(s)	• Construction of surface infrastructure (e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling, drilling blasting and development of box cut and decline shaft for mining, etc.) • Site Clearing, removal of topsoil and vegetation • General transportation, hauling and vehicle movement on site	**Status**	Negative
Nature of impact	• **Site Clearing, removal of topsoil and vegetation** o 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)) It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. o Land disturbance from clearing and excavation generates a large amount of soil disturbance and open space for wind to pick up dust particles and deposit it elsewhere (wind erosion). o The transportation of the extracted material, usually by truck and shovel methods, to the stock piles. The dust can further be created by the entrainment from the vehicle itself or due to dust blown from the back of the bin of the trucks during transportation of material to and from stockpiles. • **Construction of surface infrastructure (e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling, drilling blasting and development of box cut and decline shaft for mining, etc.)** o Generation of fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust). • **General transportation, hauling and vehicle movement on site** o Production of fugitive dust (containing TSP, as well as PM10 and PM2.5) due to suspension of friable materials from earth roads o Haul trucks generate the majority of dust emissions from surface operations. Observations of dust emissions from haul trucks show that if the dust emissions are uncontrolled, they can be a safety hazard by impairing the operator's visibility. o Substantial secondary emissions may be emitted from material moved out from the site during grading and deposited adjacent to roads. Passing traffic can thus loosen and re-suspend the deposited material again into the air. In order to minimize these impacts the stockpiles should be vegetated for the duration that it is exposed.		
Project Phase	Construction ✓	Operational	Closure and Decommissioning
Magnitude	**Extent**	Site – 2	

	Intensity	High – 5	
	Duration	Short-Medium - 2	
	Probability	Definite – 5	
Weighting Factor		Medium - 4	
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 2 + 4) x 4 = 52*	Medium
	With mitigation	WOM x ME = WM 52 x 0.4 = 20.8	Low-Medium

Table 37:Air Quality Impact Rating Table (Operational Phase)

Impact source(s)	• Use and maintenance of access roads • Emissions by means of crushing and screening. • Dust from material handling. • Haul road for transporting the ROM.		**Status**	Negative
Nature of impact	• Production of fugitive dust (containing TSP, as well as PM10 and PM2.5) due to suspension of friable materials from earth roads • Haul trucks generate the majority of dust emissions from surface operations. Observations of dust emissions from haul trucks show that if the dust emissions are uncontrolled, they can be a safety hazard by impairing the operator's visibility. • Substantial secondary emissions may be emitted from material moved out from the site during grading and deposited adjacent to roads. Passing traffic can thus loosen and re-suspend the deposited material again into the air. In order to minimize these impacts the stockpiles should be vegetated for the duration that it is exposed.			
Project Phase	Construction	Operational ✓	Closure and Decommissioning	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term – 4		
	Probability	Definite – 5		
Weighting Factor		Medium-High - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 2 + 5) x 4 = 56*		Medium
	With mitigation	WOM x ME = WM 56 x 0.4 = 22.4		Low-Medium

Table 38:Air Quality Impact Rating Table (Closure and Decommissioning Phase)

Impact source(s)	• **Demolition & Removal of all infrastructure (incl. transportation off site).** ○ Smoothing of stockpiles by bulldozer; ○ Grading of sites; ○ Transport and dumping of overburden for filling; ○ Infrastructure demolition; ○ Infrastructure rubble piles; ○ Transport and dumping of building rubble; ○ Transport and dumping of topsoil; and ○ Preparation of soil for revegetation – ploughing and addition of fertiliser, compost etc. • **Rehabilitation (spreading of soil, revegetation & profiling/contouring).**		**Status**	Negative
Nature of impact	• The impacts on the atmospheric environment during the decommissioning phase will be similar to the impacts during the construction phase. • Demolition and removal of all infrastructures will cause fugitive dust emissions			
Project Phase	Construction	Operational	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Medium – 3		
	Probability	Definite – 5		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 3+ 5) x 3 = 45*		Medium
	With mitigation	WOM x ME = WM 45 x 0.4 = 18		Low

Table 39:Air Quality Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures

Construction	• Topsoil should not be removed during windy months (August to January) due to associated wind erosion heightening dust levels in the atmosphere. • Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur. • Topsoil should be re-vegetated to reduce exposure areas. • 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. • Stockpiles should not be left for prolonged periods as wind energy generates erosion and causes more dust to form. • Emissions generated by wind are dependent on the frequency of disturbance of erodible surfaces and by covering the stockpiles with vegetation would reduce the negative erosion effect. • Any crusting of the surface binds the erodible material. • All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation). • Successful trialling of broad acre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop, providing an established vegetative stabilisation to minimise the potential for windblown dust generation. • Constricting the areas and time of exposure of pre-strip clearing in advance of mining development. • Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed thus increasing the moisture content. • Blasting should also not take place when poor atmospheric dispersion is expected i.e. early morning and late evening. • Another option would be to time the blasting with wind to ensure the dust will not be blown to the sensitive receptors or especially the community. • Material need to be removed to dedicated stockpiles to be used during rehabilitation. • This hauling of materials should take place on roads which is being watered and/or sprayed with dust suppressant. • To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. • Constricting the areas and time of exposure of pre-strip clearing in advance of construction to limit exposed soil surfaces • Hauling of materials and transportation of people should take place on roads which is being watered and/or sprayed with dust suppressant. • To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. • In order to mitigate the impacts of the activity, the speed limit should be kept to the low as more dust will be generated at higher wind speeds.

	• Speed limits need to be observed and adhered to. • Management should fit roads with speed humps to ensure adherence. • Application of wetting agents or application of dust suppressant to bind soil surfaces to avoid soil erosion. • The drop heights should be minimised when depositing materials to the ground (during the process of closing voids and rehabilitation) • Encourage car-pool and bulk delivery of materials in order to reduce the number of trips generated daily.
Operational	• Use of a global positioning system as a tool to track the locations of mining and dust suppression equipment (e.g. water carts) and cross-referencing this information with real-time weather monitoring to assist with dust control • Use of water sprays at each contact or transfer point along the conveyance system which have adjustable rates of application (low, medium and high) depending on dust levels • Use of a retractable telescopic chute with curtains to load coal into carriages/trucks • A tree windbreak located downwind of the prevailing wind direction to minimise dust from the finished product stockpiles • Topsoil handling and storage procedures including stockpile inventory, vegetative cover and signage to optimise rehabilitation and minimise wind erosion • Successful trialling of a chemical dust suppressant on haul roads resulting in a considerable reduction in the amount of water used for dust suppression on haul roads • Successful trialling of broadacre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop, providing an established vegetative stabilisation to minimise the potential for windblown dust generation • Constricting the areas and time of exposure of pre-strip clearing in advance of mining development

Closure & Decommissioning	• No low or in-pit dumping of overburden during high wind conditions • Demolition should not be performed during windy periods (August, September and October), as dust levels and the area affected by dust fallout will increase. • The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. • Speed restrictions should be imposed and enforced. • Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. • Exhaust pipes of vehicles should be directed so that they do not raise dust. • Engine cooling fans of vehicles should be shrouded 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. • Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. • Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. • Plants used for revegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings. • The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. • Spreading of soil must be performed on less windy days. • The bare soil will be prone to erosion and therefore there is need to reduce the velocity near the surface of the soil by re-vegetation. • Leaving the surface of the soil in a coarse condition reduces wind erosion and ultimately reduces the dust levels. • Additional mitigation measures include keeping the soil moist using sprays or water tanks, using wind breaks. • The best time to re-vegetate the area must be linked to the distribution and reliability of rainfall. • Speed restrictions should be imposed and enforced. • Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. • Exhaust pipes of vehicles should be directed so that they do not raise dust. • Engine cooling fans of vehicles should be shrouded 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. • It is recommended that the rehabilitation by vegetating should begin during the operational phase already as the objective is to minimise the erosion.

	• These measures should be aimed to reduce the potential for fugitive dust generation and render the impacts on ambient air quality negligible.

3.13 IMPACTS ASSOCIATED WITH THE SOCIO-ECONOMIC ASPECTS FOR ALTERNATIVE 1

Heritage

Applicable legislation applicable to environmental resources

National Heritage Resource Act No.25 of April 1999
Human Tissue Act and Ordinance 7 of 1925

Table 40:Heritage and Archaeological Impact Rating Table

Impact source(s)	• Construction activities related to vegetation clearance and soil removal • Operational activities including blasting and excavation etc		**Status**	Negative
Nature of impact	• Damage to graveyards and archaeologically sensitive areas. • Disruption of relatives visiting gravesites			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Possible – 2		
Weighting Factor		Medium - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 2) x 4 = 44*		Medium
	With mitigation	WOM x ME = WM 44 x 0.2 = 8.8		Low

Table 41: Heritage and Archaeological Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• Minimise the surface disturbance footprint of the project • Although the general area in the vicinity of the Preferred and Alternative 1 Sites were investigated, a development layout specific investigation will be required before final recommendations can be provided. • Should the Alternative 2 Site be developed, it is recommended that a fenced-off conservation buffer of 30m be established around the graveyard and that the graveyard kept tidy. The mine ECO should
Operational	

Closure & Decommissioning	regularly inspect the fence, as well as the graves before and after blasting. Should any damage be observed as a result of mining activities a qualified archaeologist must be contacted to assess the situation to provide further recommendations. • Because the settlement remains falling within the area marked as 'Sensitive' on Figure 43are most likely associated with Graveyard Alt1, it is recommended that this area be fenced-off and avoided. Should this not be possible a qualified archaeologist will have to provide updated recommendations after investigating the area during a time when site visibility is not hampered by dense vegetation cover. • 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 development beyond the surveyed areas mentioned 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 expansion, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Access must be allowed to the identified grave sites

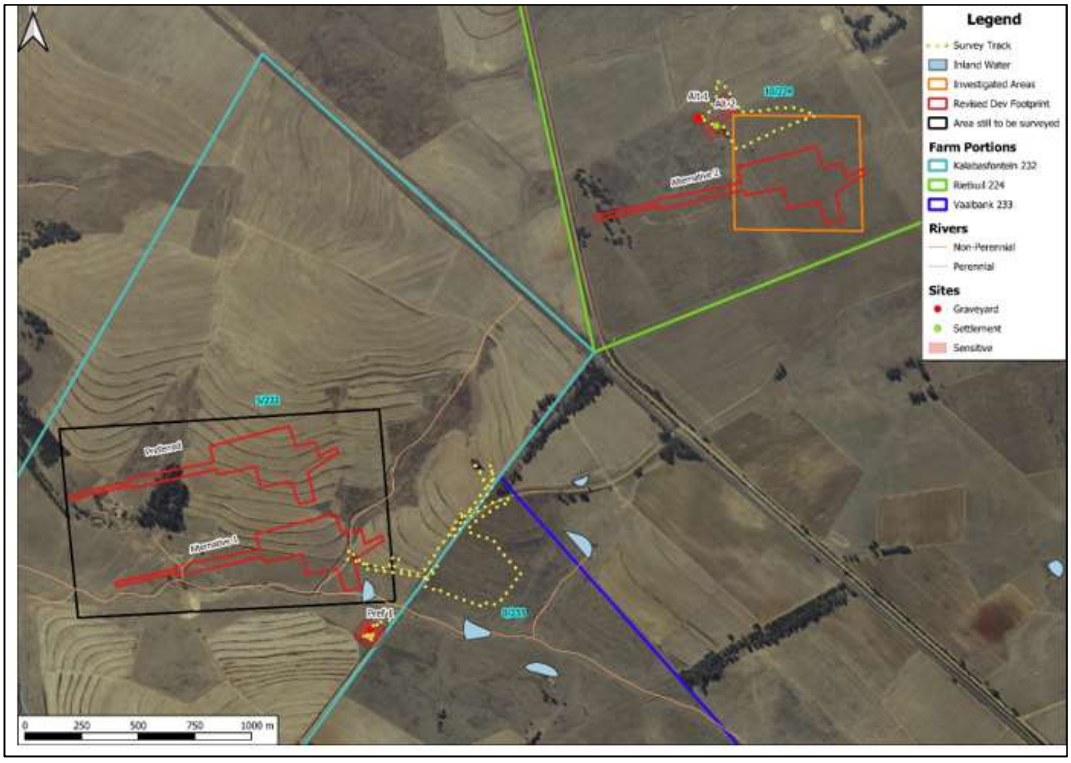


Figure 43: Observed Grave Sites

Paleontological

Applicable legislation applicable to environmental resources

- National Heritage Resource Act No.25 of April 1999

Impact source(s)	• Construction and operational activities including digging, excavating, drilling or blasting		**Status**	Negative
Nature of impact	• Damage to palaeontological articfacts			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning	
Magnitude	**Extent**	Site – 2		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Possible – 2		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 2) x 3 = 33*		Low-Medium
	With mitigation	WOM x ME = WM 33 x 0.4 = 13.2		Low

Table 42: Paleontological Impact Mitigation and Management Measures

Project Phase	Mitigation and Management Measures
Construction Operational Closure & Decommis	• Refer to mitigation and management measures related to Heritage Impacts • If any palaeontological material is exposed during SAHRA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures • Protocol for finds and Management plan must be taken into account of any finds are made • The Environmental Control Officer must familiarise him- or herself with the Vryheid Formation and its fossils.

Traffic

- National Road Traffic Act, 1996 (Act No. 93 of 1996)
- South African Constitution, 1996 (Act No. 108 of 1996)
- National Land Transport Act, Act No. 5 of 2009

Table 43: Traffic Impact Rating Table

Impact source(s)	• Coal hauling trucks using local and haulage roads to and from the mine • Additional vehicular movement created by mine contractors and employees		**Status**	Negative
Nature of impact	• Increased traffic volumes on local roads leading to increased safety issues in the vicinity of the mine • Deterioration of the road surfaces • Increased traffic volumes increasing mammal and avi-faunal mortality rates			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Regional – 3		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium-High - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 5 + 4 + 5) x 4 = 68*		Medium - High
	With mitigation	WOM x ME = WM 68 x 0.8 = 54.4		Medium

Table 44: Traffic Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• A traffic impact assessment must be conducted prior to mining commencing • The applicants should negotiate a chartered contract with existing minibus taxi or bus operators to transport the majority of the workers during the different stages of the development • The contractor is required to monitor the condition of the roads used and repair the road where it becomes damaged due construction traffic.
Operational	• Access to site will be designed and constructed as per the engineered designs which will have to be approved by SANRAL and Roads Department. • All intersections with main tarred roads must be clearly signposted.

Closure & Decommissioning	• Set speed limits to be enforced. • All mine-related vehicles and contractor vehicles to be in road worthy condition. • Contractor is required to monitor the condition of the roads used and repair the road where it becomes damaged due to construction traffic • As above • All access roads must be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to more noisy equipment. • All equipment used onsite will be regularly serviced to ensure the sound power levels remain at or below the levels used in the modelling to assess generated noise levels and compliance with the criteria. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads. • Ensure trucks and vehicles remain on roads and areas designated as a construction site to limit disturbance to areas unaffected by construction. • Ensure drivers are informed that off-road travelling is prohibited. • Ensure speed limits are set on all roads and enforce speed limits. Ensure all drivers at the site are informed about speed limits.

Noise

Applicable legislation applicable to impact

National Heritage Resource Act No.25 of April 1999
Human Tissue Act and Ordinance 7 of 1925

Table 45: Noise Disturbance Impact Rating Table

Impact source(s)	• Noise generated by the construction activities • Noise generated by all operational activities • Noise generated by vehicles and trucks on haul roads and ancillary roads • Blasting		**Status**	Negative
Nature of impact	• Noise pollution and vibration impacts experiences by sensitive receptors (Figure 44) including o Rattling of roofs or door or windows (blasting events) o Farm workers living on the respective sites; o Households located adjacent to the respective sites; and o Households located along transportation routes.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium- - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 5) x 3 = 42*		Medium

	With mitigation	WOM x ME = WM 42 x 0.6 = 25.2	Low-Medium

Table 46: Noise Impact Mitigation and Management Measures

Project Phase	Mitigation and Management Measures
Construction	• A baseline noise study must be undertaken prior to construction phase so as to determine the ambient noise levels • Noise reduction is essential and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. • The use of silent compressors is a specific requirement. • Mining-related machine 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. • Barriers (in the form of a berm) should be installed between the noise source and sensitive noise receptor, as close to the noise source as possible. • The berm will help with the attenuation of noise produced by the mining activities. A basic rule of thumb for barrier height is: Any noise barrier should be at least as tall as the line-of-sight between the noise source and the receiver, plus 30%. So if the line-of-sight is 10m high, then the barrier should be at least 13m tall for best performance. • Air blast and fly rock can be controlled using proper charging methodology irrespective of the blast hole diameter and patterns used. The only way to mitigate air blast is the design of the stemming length and stemming material. This will require changed blast design to ensure energy levels remain as expected but with increased stemming lengths and the use of proper stemming material. The used of a crushed product with size of 10 % of the blasthole diameter is the recommended material • An exclusion zone for safe blasting is established to be at least 220 m. Normal practice observed in mines is a 500 m exclusion zone. • Regulations need to be followed for permission to conduct blasting operations with these installations within 500 m from the blast operations.

Operational	• Quarterly ambient noise monitoring must start during construction phase and continue throughout the life of mine. This will assist in formulating mitigation measures should complaints about noise be received from surrounding residents or communities. • Occupational noise levels should be measured and adequate PPE given to staff exposed to high noise levels. • Fixed noise producing sources such as generators, pump stations and crushers should be either housed in enclosures or barriers put up around the noise source if complaints about noise are received. • Equipment should be switched off when not in use. • Quieter equipment must be sought where feasible. • All project employees and contractors will be instructed to avoid the use of engine compression brakes when approaching the Mine entrance or driving through or in the vicinity of the towns close to the mine • 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 more noisy equipment. • All equipment used onsite will be regularly serviced to ensure the sound power levels remain at or below the levels used in the modelling to assess generated noise levels and compliance with the criteria. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads. • The retention of as much existing vegetation as possible, specifically the existing mature trees in the area to conceal the mining activity as much as possible. • Down-lighting should also be implemented to minimise light pollution at night
Closure & Decommissioning	• As above

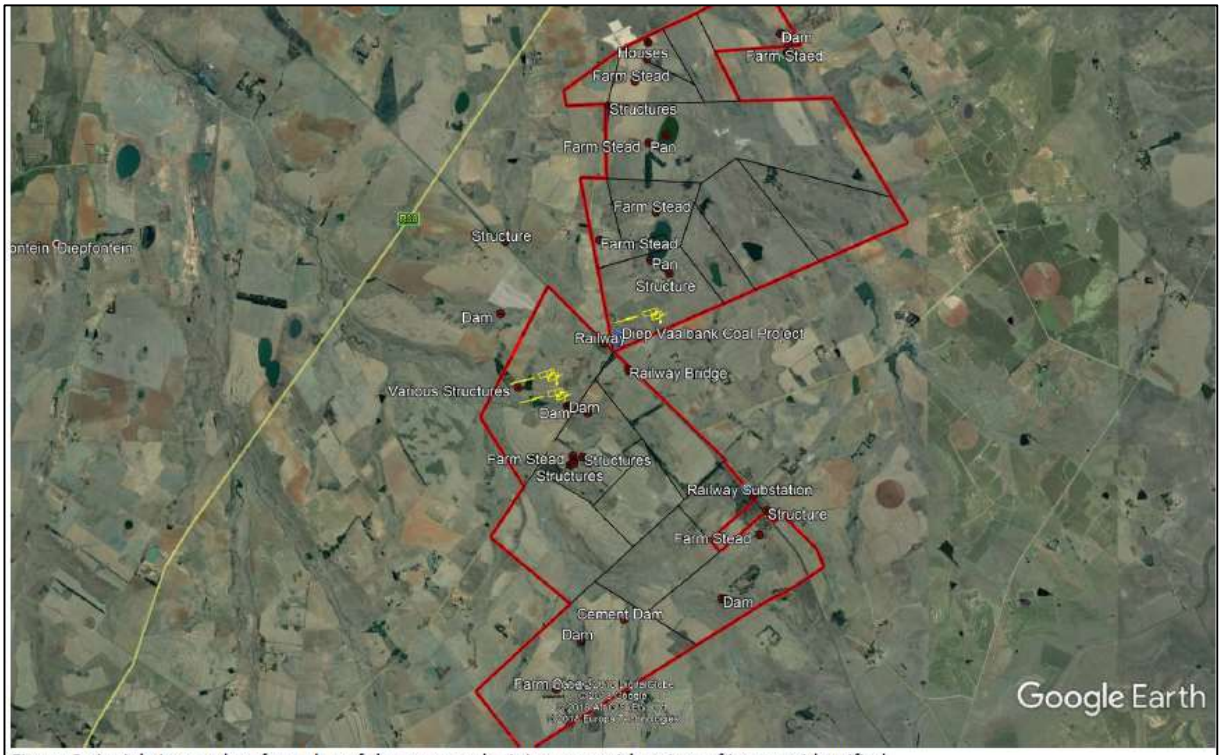


Figure 8: Aerial view and surface plan of the proposed mining area with points of interest identified

Figure 44: Sensitive Receptors Map

Sense of Place

Applicable legislation applicable to impact

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)

Table 47:Sense of Place Impact Rating Table

Impact source(s)	• Noise generation • Visual changes in the surrounding landscape • Conversion of farming activities to mining related operations • Influx of people into the area		**Status**	Negative
Nature of impact	Negative Impact on surrounding land users and the local community Health, Safety and security concerns experienced by surrounding land users and the local community			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium- 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 4 + 5) x 3 = 48*		Medium

	With mitigation	WOM x ME = WM 48 x 0.8 = 38.4	Low-Medium

Table 48:Sense of Place Impact Mitigation and Management Measures

Project Phase	Mitigation and Management Measures
Construction	• Refer to mitigation and management measures listed under noise and visual aspects • A comments and complaints register, accessible to members of public, should be implemented and maintained by the main contractor. Such a register would provide a formal framework within which to record any comments and complaints received, as well as to identify and action appropriate mitigation and/or remediation measures. The register should also include a means of recording and communicating the close-out of issues; • Establish a CMF to ensure transparency in processes followed by the applicant and its appointed contractor and to aid in the dissemination of information to community members, especially when communicating to the affected landowners and surrounding communities; • A resettlement agreement or lease agreements must be agreed upon by the Mine Contractor and the Zikalala Family Members residing on the Kalabasfontein site • Engage via the local government structures, with the local community representatives to dispense information relating to the project, possible employment opportunities and channels of communication (especially in terms of grievances); • Local residents and land owners should inform mitigation measures when addressing any potential impact on cultural heritage sites.
Operational	• Implement the recommendations of the EMP as proposed in the EIA when complete; • The developer to provide a project programme to the affected municipalities to indicate the high impact construction phases; • Reduce the potential impact on access to surrounding land and rivers for recreational use; • Integrate the values of the existing community and their lifestyle in the proposed development; • Enhance recreational, leisure and employment options in the longer term; • Reduce impacts on access to health and other services from additional population; • Ensure that adequate service infrastructure is provided to ensure continued high standards of service delivery; • Retain as much construction expenditure as possible in the regional economy; • Retain as much visitor and tourism expenditure as possible in the regional economy; • Facilitate benefits to and opportunities for local business; and • Ensure that all contractual arrangements between the project initiator and the affected municipalities are of such a nature that the full and honest intention of the parties is given effect to.
Closure & Decommissioning	• Rehabilitation of degraded areas is a must. • The use of the farm post-closure should be grazing. • Ensure that an acceptable aesthetic scenario is created post closure. This will be reached through adequate rehabilitation practices by restoring damaged and degraded habitat areas. • When closure is considered successful and rehabilitation complete, unnecessary fences should be lifted to restore larger foraging areas, especially for larger mammalian species within the area

Economic Impact

Applicable legislation

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- Labour Relations Amendment Act, 2002 (Act No. 12 of 2002)
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
- Provincial Spatial Economic Development Strategy (PSEDS)
- National Growth Plan

Table 49: Economic Impact Rating Table

Impact source(s)	All mining activities from construction to closure and decommissioning (refer to Figure 45) for the flow diagram of the economic assessment.		**Status**	Positive
Nature of impact	• Contribution to economic growth in the region (direct and indirect) – Gross Domestic Product per Region (GDPR); • Support to national and regional IDP, by supporting SA economic development. • Direct benefit of employment through the implementation of the SLP. • Multiplier effect and benefit to local business. • Supply of coal for local power generation and international distribution. • Impact on regional development (business and other); • Impact on infrastructure and resources in the region; • Impact on employment and income; and • Impact on social lives of local communities.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	National – 4		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(4 + 3 + 4 + 5) x 3 = 48*		Medium
	With mitigation	N/A		

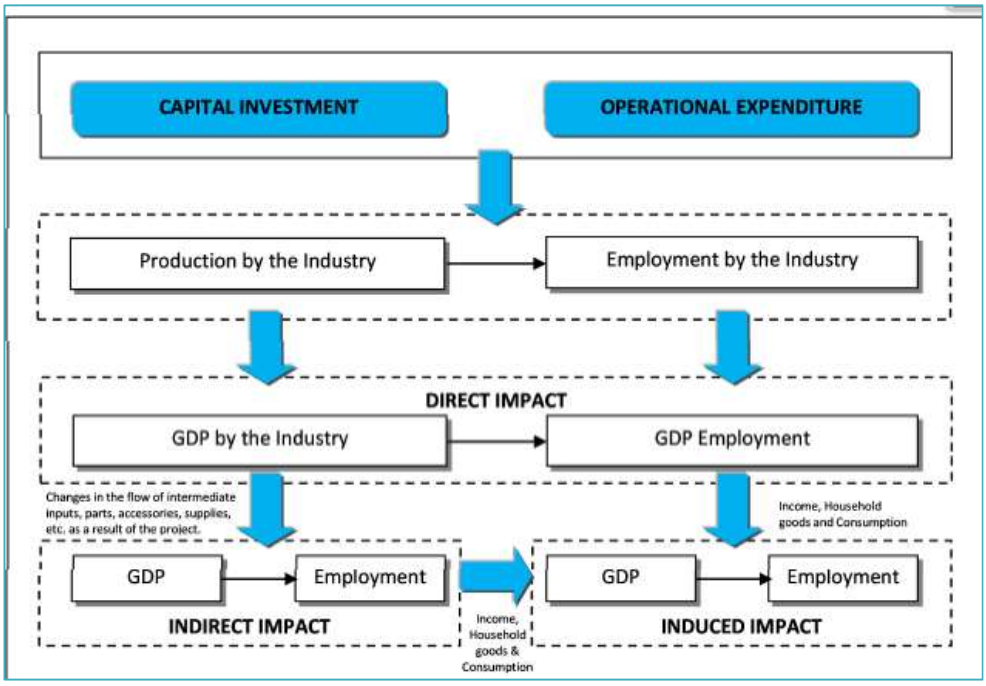


Figure 45:Economic Impact Assessment Methodology

Table 50: Economic Impact Recommendations

Project Phase	Recommendations and Management Measures to further advance the economic benefit of the mining project
Construction	• Adhere to the principles of the Broad Based Socio-Economic Empowerment Charter (BBSEEC) • Labour should be sourced from the surrounding local communities as far as possible (especially within the existing SIZ zone);

Operational	• Compile and implement a SLP to promote socio-economic development in their affected communities and to prevent or lessen negative social impacts • Ensure that the Labour Relations Amendment Act, 2002 (Act No. 12 of 2002) as well as the necessary policies and procedures are taken into consideration to ensure the correct procurement procedures. • It is suggested that non-locals should only be hired when specialist skills, which are not available locally, are required and local business providing such skills cannot be created; • Skills development opportunities should be granted to community members and local job seekers, where needed; • Maximise employment opportunities for the local communities and reduce the influx of a foreign labour force whilst ensuring an effective construction phase; • Make use of any existing skills databases and include the local councillors (within the SIZ) and other representative community structures in the process; • Project contracts between the proponent and the principle contractor should stipulate the use of local labour for unskilled and semi-skilled positions and tasks; • Local suppliers should be used as far as possible • Require from the main contractor to allocate business opportunities to local businesses, especially those of HDI, women and of SMMEs. • A comments and complaints register, accessible to members of public, should be • implemented and maintained by the main contractor. Such a register would provide • a formal framework within which to record any comments and complaints received, • as well as to identify and action appropriate mitigation and/or remediation • measures. The register should also include a means of recording and communicating • the close-out of issues; • Establish a CMF to ensure transparency in processes followed by the applicant and • its appointed contractor and to aid in the dissemination of information to • community members, especially when communicating to the affected landowners • and surrounding communities
Closure & Decommissioning	• All workers must be given sufficient notice to allow them to plan for the immediate future. • Adequate and reasonable severance packages must be provided to all workers to be retrenched.

3.14 IMPACTS ASSOCIATED WITH ENVIRONMENTAL ASPECTS OF ALTERNATIVE 2

Topography

Table 51: Topography Alteration Impact Rating Table

Impact source(s)	Levelling of the site			**Status**	Negative -
Nature of impact	Alteration of the natural topography of the site				
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓		
Magnitude	**Extent**	Site – 2			
	Intensity	High – 5			
	Duration	Long term – 4			
	Probability	Highly Likely – 4			

Weighting Factor		Medium - 3	
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5 + 4 + 4) x 3 = 45*	Medium
	With mitigation	WOM x ME = WM 45 x 0.4 = 18	Low

Table 52: Topography Alteration Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	• A per Alternative 1
Operational	• A per Alternative 1
Closure & Decommissioning	• A per Alternative 1

Soils

Table 53:Soil Erosion Impact Rating Table

Impact source(s)	• Loss of topsoil resulting in the reduction in soil quality which results from the loss of the nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. • Soil erosion is a permanent impact for once the resource has been lost from the landscape • Off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation.		**Status**	Negative
Nature of impact	• Erosion from mining activities including vehicular movement • Erosion from permanent road upgrades • Surface infrastructure like buildings, haul roads, waste rock dumps and product stockpiles are disruptive to current land uses, land capability as well as agricultural potential of the soil. Soil underneath buildings and stockpiles are subject to compaction and sterilization of the topsoil; and • Loading and hauling of coal at the product stockpiles and transporting it away from site.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium – High 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 5) x 4 = 56*		Medium

	With mitigation	WOM x ME = WM 56 x 0.4 = 22.4	Low-Medium

Table 54:Soil Erosion Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	As per Alternative 1
Operational	As per Alternative 1
Closure & Decommissioning	As per Alternative 1

Table 55: Soil Contamination Impact Rating Table

Impact source(s)	• Soil chemical pollution as a result of potential oil and fuel spillages from vehicles • Processes associated with the storing, washing, loading and transporting of coals • Handling and storage of building materials and different kinds of waste.		**Status**	Negative
Nature of impact	• Oxidation of stockpiled coal and waste material: The storage of coal and waste rock, which can contain coaliferous material, can lead to the oxidation of metal-sulphide mineral surfaces and the production of acidic water depending on the acid base accounting of the material. During the oxidation process heavy metals and other problematic ions such as sodium and sulphate can be released (through mineral breakdown owing to mineral oxidation). If the acid to base ration of the coal and coaliferous waste is such that the ensuing leachate is acidic, a second step of heavy metal, sodium and sulphate mobilisation can occur, namely through mineral dissolution owing to acidic conditions. • Hydrocarbon contamination owing to vehicle and machinery breakdown or surface run-off from maintenance and wash bays can result in the contamination of soil and surface water. • Leaking of pollution control dams could have a severe negative impact on the soil and surface water body environment. Seepage from pollution control dams is a common occurrence on mines and leads to soil and water contamination which negatively impacts on the agricultural potential of the mining and post-mining landscape. • Malfunctioning sewage treatment facilitates: Spillage or leakage from sewage treatment facilities could lead to eutrophication of the surface water and salinization of soils.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Likely – 5		
Weighting Factor		Medium - 3		

Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 4 + 5) x 3 = 60*	Medium- High
	With mitigation	WOM x ME = WM 60 x 0.4 = 22.4	Low-Medium

Table 56:Soil Contamination Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	As per Alternative 1
Operational	As per Alternative 1
Closure & Decommissioning	As per Alternative 1

Table 57:Land Capability Impact Table

Impact source(s)	Land clearance, vegetation removal, mining infrastructure and mining operations activities changing the final land capability		**Status**	Negative
Nature of impact	Soil chemical pollution, Loss of topsoil, Soil compaction,			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Low-Medium (2)		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 4 + 5) x 2 = 32*		Low-Medium
	With mitigation	WOM x ME = WM 32 x 0.8 = 25.6		Low-Medium

Table 58:Land Capability Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	A per Alternative 1

Operational	
Closure & Decommissioning	

Surface Water

Table 59: Alteration of Surface Water Resources

Activity	Potential Alteration of Physical and Chemical Properties due to: • Coal Mining & Related Activities within an area that has a wetland and pan within 1km of the mine boundary • Discharge of stormwater to Olifants River • Increased stormwater runoff from the affected footprint area due to hardened surfaces, roads, and areas of cleared vegetation; and • Accidental spillage or discharge from pollution control facilities • Pollution generated from human and other general waste generated entering the surface water resources		**Status**	Negative
Impact of Activity	• Reduced Water quality and erosion, bank destabilisation and siltation within the watercourse due to Discharge of stormwater to Olifants River			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Regional – 3		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Likely – 3		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 3 + 4 + 3) x 3 = 39*		Low-Medium
	With mitigation	WOM x ME = WM 39 x 0.4 = 15.6		Low

Table 60:Surface Water Impact Management and Mitigation Measures

Project Phase	**Mitigation and Management Measures**

Construction	• A water use license authorisation in terms of section 39 or 40 of the National Water Act, 1998 (Act No. 36 of 1998) for the Section 21(c) and (i) uses must be applied for (approval is needed prior to the undertaking of any activities related to the wetland areas) • In terms of Section 40 of the National Water Act, 1998 (Act No. 36 of 1998), a WULA and Environmental Risk Assessment (ERA) must be submitted for all activities within 500 m of a wetland • Maintain a minimum of a 100 m buffer zone around the wetland areas wherein no surface mining or related activities are allowed to take place. (Refer to Figure 46) • This buffer zone should be clearly demarcated as a "NO GO" area to prevent any accidental entrance into the area • Undermining can be considered pending the outcome of the Geotechnical Assessment. • Minimise the surface disturbance footprint of the Diep Vaalbank Coal Project • All affected areas must be air rated by means of ripping or ploughing and re-vegetated asap. • An ecological sensitive stormwater management plan should be implemented • Storm water needs to adhere to RQO's, none acidic and treated prior to discharge • Storm water to be contained or augmented in bio retention pond prior to outlet to the wetland system • Storm water diversion must take place upstream of the site should form part of the SWMP • Storm-water management practices must be applied and incorporated into management with the aid of a suitably qualified engineer to avoid disposal or spillage of any environmentally harmful materials or waste into the wetland. • Construction should also be undertaken during the dry season. • All no-go areas must be demarcated and the ECO on site should ensure that any spills are immediately reported and cleaned. Furthermore, all machines should be properly maintained and drip trays are to be placed under all equipment over night or when not working. • Riparian areas must be demarcated and protected as far as possible and if impacted, it must be rehabilitated before the wet season. • Impacted wetland systems earmarked for mining to be replaced with offset strategy • A Plant Species Plan will ensure that Alien Invasive Species are controlled all while the promotion of endemic species taking place. • Wetland Functionality will have to be monitored on a continuous basis to ensure that no degradation takes place. A Rehabilitation Plan will need to be drafted and implemented in an attempt to ensure no impact is allowed to manifest in the areas • Disturbed areas must be effectively managed to prevent deep gully incisions that eventually contributes towards soil erosion problems. • A Zero effluent discharge policy (no discharge to dam or stream) is required • Strict regulatory control on all water containing waste generated and disposal of effluent (from the sewerage treatment plant on site)

Operational	• Rehabilitate degraded areas, including the re-establishing of biodiversity and the restoration of key processes. • Maintain physical, chemical and biological processes in freshwater wetland areas. • Control and where possible eliminate alien/invasive biota to facilitate re-establishment of natural biodiversity pattern and process in invaded areas. • Strive towards re-establishment of biodiversity patterns and process in degraded land. • Remove alien vegetation in freshwater wetland areas. • Prevent or minimise development within freshwater wetlands. • Establish the distribution and density of invasive species. • Prioritise areas for alien removal focusing on biodiversity restoration. • Implement removal programs for priority species and areas (alien plants, mobile dunes). • Investigate options for the control of alien species (e.g. biological control). • Encourage and facilitate natural recovery of transformed areas • Dirty water to be collected at the station drains and sumps • Clean water diversion (bunds/ canals) to be implemented. • Good housekeeping (clean-up of spills and minimise informal storage of materials) • Leak detection through inspection • Good housekeeping (maintenance of equipment) • Storm water diversion upstream of the facilities should form part of the SWMP • Either run off will be contained in paddocks for collection and evaporation or run off will be captured in the drain system and channelled to the PCD compartment. • Monitor seepage at PCD on a quarterly basis • Isolate pollution sources with roofs, concrete bases, traps, sumps and bund walls (e.g. diesel/petrol storage, wash bays and workshops) • Roads should be surfaced or sealed with a biodegradable product • Vehicle maintenance must be conducted on bunded concrete surfaces

Closure & Decommissioning	• Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Undertake maintenance and aftercare of final rehabilitated land. Frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed • All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site. • Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible

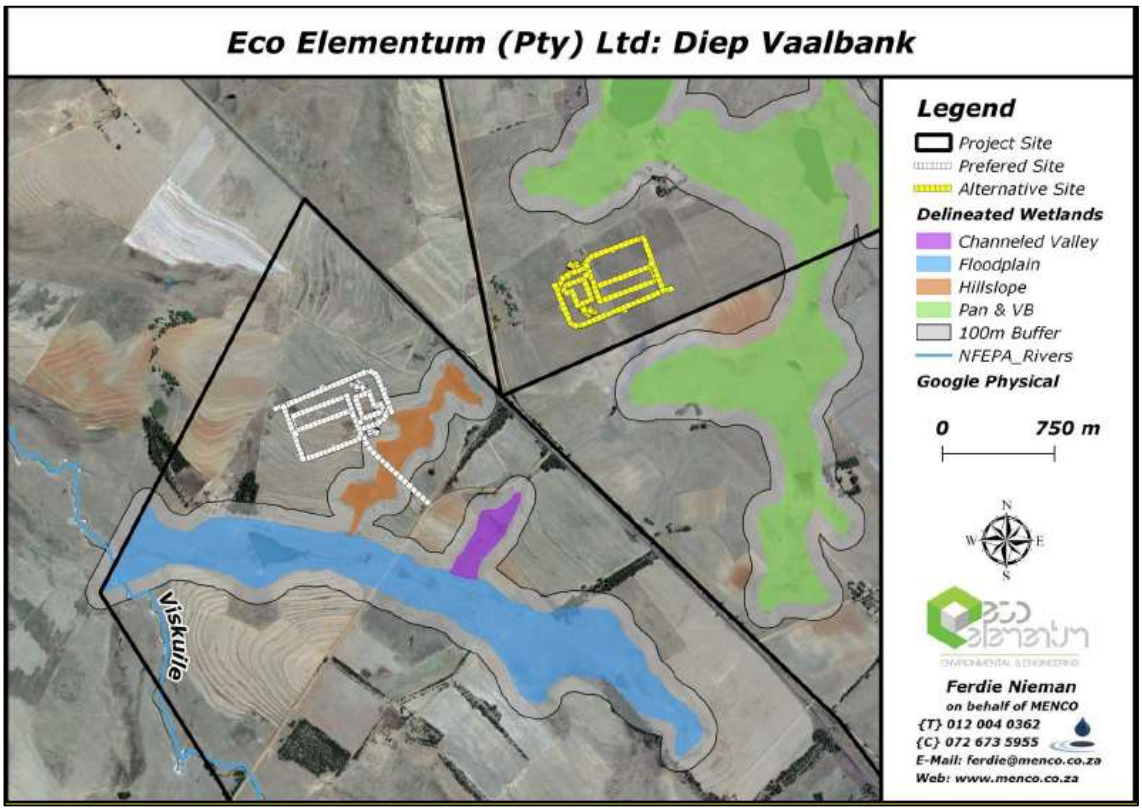


Figure 46: Wetland 100m Buffer Zone

Groundwater

Figure 47: Groundwater Impact Rating Table (Construction)

Impact source(s)	• Dewatering of water through:
	• Dewatering
	  ○ Underground mining area
	• Transport
	  ○ Plant area
	  ○ Unwashed product stockpiles
	  ○ Overburden dump
	  ○ Current Stockpiles
	  ○ Return Water Dams
	• During mining any contaminants will move along the groundwater gradient towards the underground.
			Status	Negative

Nature of impact	• Impact on groundwater quality • Impact on groundwater quantity			
Project Phase	Construction ✓	Operational	Closure and Decommissioning	
Magnitude	**Extent**	Regional – 3		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Highly Likely – 4		
Weighting Factor		Medium - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 3 + 4 + 4) x 4 = 56*		Medium
	With mitigation	WOM x ME = WM 56 x 0.4 = 22.4		Low-Medium

Table 61:Groundwater Impact Rating Table (Operation)

Impact source(s)	• Dewatering the groundwater resource and; • Contamination through ARD processes		**Status**	Negative
Nature of impact	• Lowering of groundwater table: • Impact on water supply of groundwater users surrounding the mine • Potential impact on base flow of streams and wetland systems			
Project Phase	Construction	Operational ✓	Closure and Decommissioning	
Magnitude	**Extent**	Regional – 3		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Likely – 3		
Weighting Factor		Medium - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 5+ 4+ 3) x 4 = 60*		Medium - High
	With mitigation	WOM x ME = WM 60 x 0.6 = 36		Low-Medium

Table 62:Groundwater Impact Rating Table (Closure and Decommissioning)

Impact source(s)	• Groundwater rebound following the mine closure and termination of dewatering		**Status**	Negative
Nature of impact	• As some discards and exposed reactive mineral surfaces will remain in the mine, this outflow could be contaminated as a result of acid mine drainage. • The leachate plume emanating from the mine may impact on the wetlands, streams and groundwater			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Regional – 3		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Likely – 3		
Weighting Factor		Low-Medium -2		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 5 + 4 + 3) x 2 = 30*		Low-Medium
	With mitigation	WOM x ME = WM 30 x 0.6 = 18		LOW

Table 63: Groundwater Impact Management and Management Measures

Project Phase	Mitigation and Management Measures
Construction	As per Alternative 1
Operational	As per Alternative 1
Closure & Decommissioning	As per Alternative 1

Vegetation (Flora) and Animals (Fauna)

Table 64: Vegetation disturbance Impact Rating Table

Impact source(s)	• Site preparation, removal of vegetation and topsoil before mining starts • Infringement of riparian zone and sensitive areas • Damage caused by staff and contractors if allowed to access certain natural areas (no-go areas) • Dust pollution		**Status**	Negative
Nature of impact	• The construction phase will have the most impact on plant communities with the removal of plant species and clearing of spaces. • Managing invasive plant species that increase during the operational phase of the project is an ongoing process and if not managed regularly could result in severe changes and competition in plant communities. • The topsoil that is removed may become spoilt and/or infertile making the replacement of the soil an ineffective process. The topsoil (A-zone) may also be stored together with the remainder of the soil removed making the replacement of topsoil unfeasible. • Without proper knowledge and/or mitigation measures. Endemic and/or vulnerable species that could possibly occur within the area of construction could be destroyed. • Flora could be damaged by staff and contractors if they are allowed to access certain natural areas that should be indicated as no-go zones. • Dust pollution could occur and could be severe if the necessary dust suppression mechanisms are not in place. • Most of the impacts on plant species will occur during the construction- and operational phases. Once the operation has been decommissioned, final steps in the rehabilitation process will take place. It is, however, possible that the rehabilitation plans are not feasible or only implemented and planned at a later stage than planned, hindering successful rehabilitation			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Low - 1		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5 + 4 + 5) x 1 = 16*		Low
	With mitigation	WOM x ME = WM 16x 0.6 = 9.6		Low

Table 65: Vegetation Impact Management and Mitigation Measurements

Project Phase	Mitigation and Management Measures
Construction	As per Alternative 1
Operational	As per Alternative 1

Closure & Decommissioning	As per Alternative 1

Animals (Fauna)

Table 66: Faunal Displacement Impact Rating Table

Impact source(s)	• Site preparation, removal of vegetation and topsoil before mining starts • Damage caused by staff and contractors if allowed to access certain natural areas (no-go areas) • Dust and noise pollution • Soil erosion • Off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation • Continued effects of haul roads and vehicle traffic on mammal movement		**Status**	Negative
Nature of impact	• The removal of vegetation areas will result in the destruction of microhabitats and burrows of animals. It might also result in the disturbance of sensitive animal species. This will lead to increases in inter- and intra-specific competition between species for the remaining habitats and food. The result is the out-competing of individuals and certain species if the habitat is not totally destroyed. • Noises during the operational phase due to the operation of the kilns and associated activities will result in a less favourable habitat for species and several communities may seek other more favourable areas to inhabit. • Certain animal species have specific foraging and breeding ground needs. Erecting fences around areas and other activities in the foraging and breeding grounds of certain animals will affect the viability of the habitat that they may need to sustain themselves. • Anthropogenic influence stemming from workers that infiltrate/penetrate the natural veld areas will have a possibly damaging impact on species communities in the area. • The completion of the decommissioning process might recreate microhabitats and burrows that had been destroyed in the construction/operational phase. The impact is therefore seen as minimal and animals will start to inhabit areas that have been previously deemed uninhabitable due to activity and noises, if the area is rehabilitated correctly.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Likely – 3		
Weighting Factor		Medium - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5 + 4 + 3) x 3 = 42*		Medium
	With mitigation	WOM x ME = WM 42 x 0.6 = 25.2		Low-Medium

Table 67: Faunal Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures

Construction	As per Alternative 1
Operational	• As per Alternative 1
Closure & Decommissioning	• As per Alternative 1

Air Quality

Table 68:Air Quality Impact Rating Table (Construction Phase)

Impact source(s)	• Construction of surface infrastructure (e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling, drilling blasting and development of box cut and decline shaft for mining, etc.) • Site Clearing, removal of topsoil and vegetation • General transportation, hauling and vehicle movement on site	**Status**	Negative
Nature of impact	• **Site Clearing, removal of topsoil and vegetation** o 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)) It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. o Land disturbance from clearing and excavation generates a large amount of soil disturbance and open space for wind to pick up dust particles and deposit it elsewhere (wind erosion). o The transportation of the extracted material, usually by truck and shovel methods, to the stock piles. The dust can further be created by the entrainment from the vehicle itself or due to dust blown from the back of the bin of the trucks during transportation of material to and from stockpiles. • **Construction of surface infrastructure (e.g. access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling, drilling blasting and development of box cut and decline shaft for mining, etc.)** o Generation of fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust). • **General transportation, hauling and vehicle movement on site** o Production of fugitive dust (containing TSP, as well as PM10 and PM2.5) due to suspension of friable materials from earth roads o Haul trucks generate the majority of dust emissions from surface operations. Observations of dust emissions from haul trucks show that if the dust emissions are uncontrolled, they can be a safety hazard by impairing the operator's visibility. o Substantial secondary emissions may be emitted from material moved out from the site during grading and deposited adjacent to roads. Passing traffic can thus loosen and re-suspend the deposited material again into the air. In order to minimize these impacts the stockpiles should be vegetated for the duration that it is exposed.		
Project Phase	Construction ✓	Operational	Closure and Decommissioning
Magnitude	**Extent**	Site – 2	
	Intensity	High – 5	
	Duration	Short-Medium - 2	
	Probability	Definite – 5	
Weighting Factor		Medium - 4	
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 2 + 4) x 4 = 52*	Medium
	With mitigation	WOM x ME = WM 52 x 0.4 = 20.8	Low-Medium

Table 69:Air Quality Impact Rating Table (Operational Phase)

Impact source(s)	• Use and maintenance of access roads • Emissions by means of crushing and screening. • Dust from material handling. • Haul road for transporting the ROM.		**Status**	Negative
Nature of impact	• Production of fugitive dust (containing TSP, as well as PM10 and PM2.5) due to suspension of friable materials from earth roads • Haul trucks generate the majority of dust emissions from surface operations. Observations of dust emissions from haul trucks show that if the dust emissions are uncontrolled, they can be a safety hazard by impairing the operator's visibility. • Substantial secondary emissions may be emitted from material moved out from the site during grading and deposited adjacent to roads. Passing traffic can thus loosen and re-suspend the deposited material again into the air. In order to minimize these impacts the stockpiles should be vegetated for the duration that it is exposed.			
Project Phase	Construction	Operational ✓	Closure and Decommissioning	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term – 4		
	Probability	Definite – 5		
Weighting Factor		Medium-High - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 2 + 5) x 4 = 56*		Medium
	With mitigation	WOM x ME = WM 56 x 0.4 = 22.4		Low-Medium

Table 70:Air Quality Impact Rating Table (Closure and Decommissioning Phase)

Impact source(s)	• **Demolition & Removal of all infrastructure (incl. transportation off site).** ○ Smoothing of stockpiles by bulldozer; ○ Grading of sites; ○ Transport and dumping of overburden for filling; ○ Infrastructure demolition; ○ Infrastructure rubble piles; ○ Transport and dumping of building rubble; ○ Transport and dumping of topsoil; and ○ Preparation of soil for revegetation – ploughing and addition of fertiliser, compost etc. • **Rehabilitation (spreading of soil, revegetation & profiling/contouring).**		**Status**	Negative
Nature of impact	• The impacts on the atmospheric environment during the decommissioning phase will be similar to the impacts during the construction phase. • Demolition and removal of all infrastructures will cause fugitive dust emissions			
Project Phase	Construction	Operational	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Medium – 3		
	Probability	Definite – 5		
Weighting Factor		Medium - 3		

Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 3+ 5) x 3 = 45*	Medium
	With mitigation	WOM x ME = WM 45 x 0.4 = 18	Low

Table 71:Air Quality Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	As per Alternative 1
Operational	As per Alternative 1
Closure & Decommissioning	As per Alternative 1

3.15 IMPACTS ASSOCIATED WITH THE SOCIO-ECONOMIC ASPECTS FOR ALTERNATIVE 2

Heritage

Applicable legislation applicable to environmental resources

National Heritage Resource Act No.25 of April 1999
Human Tissue Act and Ordinance 7 of 1925

Table 72:Heritage and Archaeological Impact Rating Table

Impact source(s)	• Construction activities related to vegetation clearance and soil removal • Operational activities including blasting and excavation etc		**Status**	Negative
Nature of impact	• Damage to graveyards and archaeologically sensitive areas. • Disruption of relatives visiting gravesites			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	Medium – 3		
	Duration	Long Term - 4		
	Probability	Likely– 3		
Weighting Factor		High - 5		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 3) x 4 = 60*		Medium – High

	With mitigation	WOM x ME = WM 60 x 0.4 = 24	Low-Medium

Table 73: Heritage and Archaeological Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction Operational Closure & Decommissioning	• Should the Alternative 2 Site be developed, it is recommended that a fenced-off conservation buffer of 30m be established around the graveyard and that the graveyard kept tidy. The mine ECO should regularly inspect the fence, as well as the graves before and after blasting. Should any damage be observed as a result of mining activities a qualified archaeologist must be contacted to assess the situation to provide further recommendations • Should this not be possible a qualified archaeologist will have to provide updated recommendations after investigating the area during a time when site visibility is not hampered by dense vegetation cover. • 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 development beyond the surveyed areas mentioned 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 expansion, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Access must be allowed to the identified grave sites

Paleontological

Applicable legislation applicable to environmental resources

- National Heritage Resource Act No.25 of April 1999

Impact source(s)	• Construction and operational activities including digging, excavating, drilling or blasting			**Status**	Negative
Nature of impact	• Damage to palaeontological articfacts				
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning		
Magnitude	**Extent**	Site – 2			
	Intensity	Medium – 3			
	Duration	Long Term - 4			
	Probability	Possible – 2			
Weighting Factor	Medium - 3				

Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 2) x 3 = 33*	Low-Medium
	With mitigation	WOM x ME = WM 33 x 0.4 = 13.2	Low

Table 74: Paleontological Impact Mitigation and Management Measures

Project Phase	Mitigation and Management Measures
Construction	As per Alternative 1
Operational	
Closure & Decommissioning	

Traffic

Table 75: Traffic Impact Rating Table

Impact source(s)	• Coal hauling trucks using local and haulage roads to and from the mine • Additional vehicular movement created by mine contractors and employees		**Status**	Negative
Nature of impact	• Increased traffic volumes on local roads leading to increased safety issues in the vicinity of the mine • Deterioration of the road surfaces • Increased traffic volumes increasing mammal and avi-faunal mortality rates			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Regional – 3		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium-High - 4		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(3 + 5 + 4 + 5) x 4 = 68*		Medium - High
	With mitigation	WOM x ME = WM 68 x 0.8 = 54.4		Medium

Table 76: Traffic Impact Management and Mitigation Measures

Project Phase	Mitigation and Management Measures
Construction	Refer to Alternative 1 Mitigation Table
Operational	
Closure & Decommissioning	

Noise

Applicable legislation applicable to impact

National Heritage Resource Act No.25 of April 1999
Human Tissue Act and Ordinance 7 of 1925

Table 77: Noise Disturbance Impact Rating Table

Impact source(s)	• Noise generated by the construction activities • Noise generated by all operational activities • Noise generated by vehicles and trucks on haul roads and ancillary roads		**Status**	Negative
Nature of impact	• Noise pollution experiences by sensitive receptors including o Farm workers living on the respective sites; o Households located adjacent to the respective sites; and o Households located along transportation routes.			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium- - 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 3 + 4 + 5) x 3 = 42*		Medium
	With mitigation	WOM x ME = WM 42 x 0.6 = 25.2		Low-Medium

Table 78: Noise Impact Mitigation and Management Measures

Project Phase	Mitigation and Management Measures
Construction	Refer to Alternative 1
Operational	
Closure & Decommissioning	

Sense of Place

Applicable legislation applicable to impact

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)

Table 79:Sense of Place Impact Rating Table

Impact source(s)	• Noise generation • Visual changes in the surrounding landscape • Conversion of farming activities to mining related operations • Influx of people into the area		**Status**	Negative
Nature of impact	Negative Impact on surrounding land users and the local community Health, Safety and security concerns experienced by surrounding land users and the local community			
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓	
Magnitude	**Extent**	Site – 2		
	Intensity	High – 5		
	Duration	Long Term - 4		
	Probability	Definite – 5		
Weighting Factor		Medium- 3		
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(2 + 5+ 4 + 5) x 3 = 48*		Medium
	With mitigation	WOM x ME = WM 48 x 0.8 = 38.4		Low-Medium

Table 80:Sense of Place Impact Mitigation and Management Measures

Project Phase	Mitigation and Management Measures
Construction	• Refer to mitigation and management measures listed under Alternative 1
Operational	• Refer to mitigation and management measures listed under Alternative 1
Closure & Decommissioning	• Refer to mitigation and management measures listed under Alternative 1

Economic Impact

Applicable legislation

- South African Constitution, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (Act No. 107 of 1998)
- Labour Relations Amendment Act, 2002 (Act No. 12 of 2002)
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
- Provincial Spatial Economic Development Strategy (PSEDS)
- National Growth Plan

Table 81: Economic Impact Rating Table

Impact source(s)	All mining activities from construction to closure and decommissioning			**Status**	Positive
Nature of impact	• Contribution to economic growth in the region (direct and indirect) – Gross Domestic Product per Region (GDPR); • Support to national and regional IDP, by supporting SA economic development. • Direct benefit of employment through the implementation of the SLP. • Multiplier effect and benefit to local business. • Supply of coal for local power generation and international distribution. • Impact on regional development (business and other); • Impact on infrastructure and resources in the region; • Impact on employment and income; and • Impact on social lives of local communities.				
Project Phase	Construction ✓	Operational ✓	Closure and Decommissioning ✓		
Magnitude	**Extent**	National – 4			
	Intensity	Medium – 3			
	Duration	Long Term - 4			

	Probability	Definite – 5	
Weighting Factor		Medium - 3	
Significance	**Without mitigation**	*(Extent + Intensity + Duration + Probability) x WF* *(4 + 3 + 4 + 5) x 3 = 48*	Medium
	With mitigation	N/A	

Table 82: Economic Impact Recommendations

Project Phase	Recommendations and Management Measures to further advance the economic benefit of the mining project
Construction	• Refer to Alternative 1
Operational	
Closure & Decommissioning	

k) Assessment of each identified potentially significant impact and risk

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

Table 83: Assessment of Each Identified Potentially Significant Impact and Risk

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)		Mitigation and Management Measures
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation	
CONSTRUCTION PHASE					
Alteration of Natural Topography	**Medium**	**Low**	**Medium**	**Low**	**Refer to the Environmental Management Plan (Part B) and measures listed under each risk assessment described in the previous section**
Soil Erosion	**Medium**	**Low**	**Medium**	**Low-Medium**	
Soil Contamination	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**	
Change in land capability	**Medium - High**	**Low-Medium**	**Low Medium**	**Low-Medium**	
Surface Water Pollution and Alteration of Natural Drainage Lines	**High**	**Medium**	**Low-Medium**	**Low**	
Groundwater Pollution and Quantity	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Terrestrial (Floral Damage and Alternation)	**Medium**	**Low-Medium**	**Low**	**Low**	
Terrestrial (Faunal Displacement and Higher mortality rates)	**Medium - High**	**Low-Medium**	**Medium**	**Low-Medium**	
Air Quality	**Medium**	**Low-Medium**	**Medium**	**Low**	
Positive Economic Benefit	**Medium**	**N/A**	**Medium**	**N/A**	

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)		Mitigation and Management Measures
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation	
Altering of sense of place for local community	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Rise in noise and vibration levels	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Increase in traffic volumes and accident rates	**Medium-High**	**Medium**	**Medium-High**	**Medium**	
Damage to heritage and archeological objects	**Medium**	**Low**	**Medium-High**	**Low-Medium**	
Damage to Paleontological artifacts	**Low-Medium**	**Low**	**Low-Medium**	**Low-Medium**	
OPERATIONAL PHASE					
Alteration of Natural Topography	**Medium**	**Low**	**Medium**	**Low**	**Refer to the Environmental Management Plan (Part B) and measures listed under each risk assessment described in the previous section**
Soil Erosion	**Medium**	**Low**	**Medium**	**Low-Medium**	
Soil Contamination	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**	
Change in land capability	**Medium - High**	**Medium**	**Low Medium**	**Low-Medium**	
Surface Water Pollution and Alteration of Natural Drainage Lines	**High**	**Medium**	**Low-Medium**	**Low**	
Groundwater Pollution and Quantity	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**	
Terrestrial (Floral Damage and Alternation)	**Medium**	**Low-Medium**	**Low**	**Low**	
Terrestrial (Faunal Displacement and Higher mortality rates)	**Medium - High**	**Low-Medium**	**Medium**	**Low-Medium**	

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)		Mitigation and Management Measures
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation	
Air Quality	**Medium**	**Low-Medium**	**Medium**	**Low**	
Positive Economic Benefit	**Medium**	**N/A**	**Medium**	**N/A**	
Altering of sense of place for local community	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Rise in noise and vibration levels	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Increase in traffic volumes and accident rates	**Medium-High**	**Medium**	**Medium-High**	**Medium**	
Damage to heritage and archeological objects	**Medium**	**Low**	**Medium-High**	**Medium**	
Damage to Paleontological artifacts	**Low-Medium**	**Low**	**Low-Medium**	**Low**	
CLOSURE AND DECOMMISIONING PHASE					
Alteration of Natural Topography	**Medium**	**Low**	**Medium**	**Low**	**Refer to the Environmental Management Plan (Part B) and measures listed under each risk assessment described in the previous section**
Soil Erosion	**Medium**	**Low**	**Medium**	**Low-Medium**	
Soil Contamination	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**	
Change in land capability	**Medium - High**	**Medium**	**Low Medium**	**Low-Medium**	
Surface Water Pollution and Alteration of Natural Drainage Lines	**High**	**Medium**	**Low-Medium**	**Low**	
Groundwater Pollution and Quantity	**Low-Medium**	**Low**	**Low-Medium**	**Low**	

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)		Mitigation and Management Measures
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation	
Terrestrial (Floral Damage and Alternation)	**Medium**	**Low-Medium**	**Low**	**Low**	
Terrestrial (Faunal Displacement and Higher mortality rates)	**Medium - High**	**Low-Medium**	**Medium**	**Low-Medium**	
Air Quality	**Medium**	**Medium**	**Medium**	**Low-Medium**	
Positive Economic Benefit	**Medium**	**N/A**	**Medium**	**N/A**	
Altering of sense of place for local community	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Rise in noise and vibration levels	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**	
Increase in traffic volumes and accident rates	**Medium-High**	**Medium**	**Medium-High**	**Medium**	
Damage to heritage and archeological objects	**Medium**	**Low**	**Medium-High**	**Medium**	
Damage to Paleontological artifacts	**Low-Medium**	**Low**	**Low-Medium**	**Low**	

The supporting impact assessment conducted by the EAP must be attached as an appendix (refer to impact assessment in above sections)

a) Summary of specialist reports.

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

Table 84: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Socio-Economic Impact Study	Recommendations of specialists included in the mitigation and management measures tables as part of the risk assessment section and the Environmental Management Plan – Part B of the EIA Report)	X	Land Capability Impact Management and Mitigation Measures Air Quality Impact Management and Mitigation Measures Traffic Impact Management and Mitigation Measures Noise Impact Mitigation and Management Measures Sense of Place Impact Mitigation and Management Measures Economic Impact Recommendations Table
Air quality		X	Air Quality Impact Management and Mitigation Measures Noise Impact Mitigation and Management Measures
Traffic Management		X	Traffic Impact Management and Mitigation Measures
Storm Water Management Plan (Draft)		X	Surface Water Impact Management and Mitigation Measures
Aquatic Ecology		X	Surface Water Impact Management and Mitigation Measures Vegetation Impact Management and Mitigation Measurements Faunal Impact Management and Mitigation Measures
Visual Impact Assessment		X	Air Quality Impact Management and Mitigation Measures
Blasting and Vibration		X	Air Quality Impact Management and Mitigation Measures Noise Impact Mitigation and Management Measures
Ecological		X	Soil Erosion Impact Management and Mitigation Measures Land Capability Impact Management and Mitigation Measures Vegetation Impact Management and Mitigation Measurements

			Faunal Impact Management and Mitigation Measures
Geo-hydrological		**X**	Surface Water Impact Management and Mitigation Measures Groundwater Impact Management and Mitigation Measures
Surface water		**X**	Surface Water Impact Management and Mitigation Measures
Wetland		**X**	Soil Erosion Impact Management and Mitigation Measures Surface Water Impact Management and Mitigation Measures Vegetation Impact Management and Mitigation Measurements
Heritage, Archaeological		**X**	Heritage and Archaeological Impact Management and Mitigation Measures
Paleontological		**X**	Heritage and Archaeological Impact Management and Mitigation Measures Paleontological Impact Mitigation and Management Measures
Civil Engineering		**X**	Surface Water Impact Management and Mitigation Measures Soil Erosion Impact Management and Mitigation Measures
Soils, land use and land capability		**X**	Topography Impact Management and Mitigation Measures Table Soil Erosion Impact Management and Mitigation Measures Land Capability Impact Management and Mitigation Measures Faunal Impact Management and Mitigation Measures Traffic Impact Management and Mitigation Measures
Blasting and Vibration		**X**	Air Quality Impact Management and Mitigation Measures Noise Impact Mitigation and Management Measures

Attach copies of Specialist Reports as Appendices (Annexure 6)

b) Environmental impact statement

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

Based on the outcome of the impact assessment rating system, it becomes evident that Alternative 2 (mine infrastructure on Portion 10 of the Farm Rietkuil 224 IS) has potentially lower environmental impacts. This is predominately due to the fact that the site is not located within close proximity of a wetland or sensitive habitat. In terms of the heritage and archaeological findings, the alternative is however considered sensitive due to a settlement foundation that might be associated with the nearby identified graveyard (in close proximity of the mining footprint on the same property). This alternative (Alternative 2) is however deemed to be problematic from a socio-economic perspective, as the landowner (Mr Uys) has objected to the project due to economic factors including active farming practices and lease agreement agreed upon for the next 7 years.

Alternative 1 (Preferred site located on Portion 5 of the Farm Kalabasfontein 232 IS) infringes on a wetland buffer and is also associated with the crossing of hillslope seepage area. There is however an existing gravel road (used by the existing farming community) crossing this portion of the hillslope seepage which can be used and upgraded by ecological sensitive civil designs which enhances the current water flow capabilities. The wetland and surface water studies have delineated the wetland and imposed a 100m around the wetland area. It is therefor recommended that a third alternative (Alternative 3) is considered whereby the mining footprint and layout is moved further to the west of the wetland area so as to be completely out of the buffer zone of the wetland and associated riparian zone.

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 4**

Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

Refer to the table below. Where the significance rating after mitigation differed between the 2 Alternatives, the lower rating (thus more preferred layout in terms of the particular impact) was highlighted in green (low) or orange (medium).

Table 85:Summary of Positive and Negative Impacts

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
CONSTRUCTION PHASE				
Alteration of Natural Topography	**Medium**	**Low**	**Medium**	**Low**
Soil Erosion	**Medium**	**Low**	**Medium**	**Low-Medium**
Soil Contamination	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**
Change in land capability	**Medium - High**	**Low-Medium**	**Low Medium**	**Low-Medium**
Surface Water Pollution and Alteration of Natural Drainage Lines	**High**	**Medium**	**Low-Medium**	**Low**
Groundwater Pollution and Quantity	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**
Terrestrial (Floral Damage and Alternation)	**Medium**	**Low-Medium**	**Low**	**Low**
Terrestrial (Faunal Displacement and Higher mortality rates)	**Medium - High**	**Low-Medium**	**Medium**	**Low-Medium**
Air Quality	**Medium**	**Low-Medium**	**Medium**	**Low**
Positive Economic Benefit	**Medium**	**N/A**	**Medium**	**N/A**
Altering of sense of place for local community	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**
Rise in noise and vibration levels	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
Increase in traffic volumes and accident rates	**Medium-High**	**Medium**	**Medium-High**	**Medium**
Damage to heritage and archeological objects	**Medium**	**Low**	**Medium-High**	**Low-Medium**
Damage to Paleontological artifacts	**Low-Medium**	**Low**	**Low-Medium**	**Low-Medium**
OPERATIONAL PHASE				
Alteration of Natural Topography	**Medium**	**Low**	**Medium**	**Low**
Soil Erosion	**Medium**	**Low**	**Medium**	**Low-Medium**
Soil Contamination	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**
Change in land capability	**Medium - High**	**Medium**	**Low Medium**	**Low-Medium**
Surface Water Pollution and Alteration of Natural Drainage Lines	**High**	**Medium**	**Low-Medium**	**Low**
Groundwater Pollution and Quantity	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**
Terrestrial (Floral Damage and Alternation)	**Medium**	**Low-Medium**	**Low**	**Low**
Terrestrial (Faunal Displacement and Higher mortality rates)	**Medium - High**	**Low-Medium**	**Medium**	**Low-Medium**
Air Quality	**Medium**	**Low-Medium**	**Medium**	**Low**
Positive Economic Benefit	**Medium**	**N/A**	**Medium**	**N/A**

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
Altering of sense of place for local community	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**
Rise in noise and vibration levels	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**
Increase in traffic volumes and accident rates	**Medium-High**	**Medium**	**Medium-High**	**Medium**
Damage to heritage and archeological objects	**Medium**	**Low**	**Medium-High**	**Medium**
Damage to Paleontological artifacts	**Low-Medium**	**Low**	**Low-Medium**	**Low**
CLOSURE AND DECOMMISIONING PHASE				
Alteration of Natural Topography	**Medium**	**Low**	**Medium**	**Low**
Soil Erosion	**Medium**	**Low**	**Medium**	**Low-Medium**
Soil Contamination	**Medium - High**	**Low-Medium**	**Medium-High**	**Low-Medium**
Change in land capability	**Medium - High**	**Medium**	**Low Medium**	**Low-Medium**
Surface Water Pollution and Alteration of Natural Drainage Lines	**High**	**Medium**	**Low-Medium**	**Low**
Groundwater Pollution and Quantity	**Low-Medium**	**Low**	**Low-Medium**	**Low**
Terrestrial (Floral Damage and Alternation)	**Medium**	**Low-Medium**	**Low**	**Low**

Potential Significant Impacts	Alternative 1 Preferred Site (Portion 5 of the Farm Kalabasfontein 232 IS)		Alternative 2 (Portion 10 of the Farm Rietkuil 224IS 232 IS)	
	Significance Without Mitigation	Significance with Mitigation	Significance Without Mitigation	Significance with Mitigation
Terrestrial (Faunal Displacement and Higher mortality rates)	**Medium - High**	**Low-Medium**	**Medium**	**Low-Medium**
Air Quality	**Medium**	**Medium**	**Medium**	**Low-Medium**
Positive Economic Benefit	**Medium**	**N/A**	**Medium**	**N/A**
Altering of sense of place for local community	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**
Rise in noise and vibration levels	**Medium**	**Low-Medium**	**Medium**	**Low-Medium**
Increase in traffic volumes and accident rates	**Medium-High**	**Medium**	**Medium-High**	**Medium**
Damage to heritage and archeological objects	**Medium**	**Low**	**Medium-High**	**Medium**
Damage to Paleontological artifacts	**Low-Medium**	**Low**	**Low-Medium**	**Low**

c) 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.

To be populated with final specialist findings based on the detailed layout design.

d) Final proposed alternatives.

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

Based on the outcome of the impact assessment rating system, it becomes evident that Alternative 2 (mine infrastructure on Portion 10 of the Farm Rietkuil 224 IS) has potentially lower environmental impacts. This is predominately due to the fact that the site is not located within close proximity of a wetland or sensitive habitat. In terms of the heritage and archaeological findings, the alternative is however considered sensitive due to a settlement foundation that might be associated with the nearby identified graveyard (in close proximity of the mining footprint on the same property). This alternative (Alternative 2) is however deemed to be problematic from a socio-economic perspective, as the landowner (Mr Uys) has objected to the project due to economic factors including active farming practices and lease agreement agreed upon for the next 7 years.

Alternative 1 (Preferred site located on Portion 5 of the Farm Kalabasfontein 232 IS) infringes on a wetland buffer and is also associated with the crossing of hillslope seepage area. There is however an existing gravel road (used by the existing farming community) crossing this portion of the hillslope seepage which can be used and upgraded by ecological sensitive civil designs which enhances the current water flow capabilities. The wetland and surface water studies have delineated the wetland and imposed a 100m around the wetland area. ***It is therefore recommended that a third alternative (Alternative 3) is considered whereby the mining footprint and layout is moved further to the west of the wetland area so as to be completely out of the buffer zone of the wetland and associated riparian zone.***

e) Aspects for inclusion as conditions of Authorisation.

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

f) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

Final layout plan to be provided and assessed by the various specialists.

Baseline Noise Levels to established

Baseline air quality level to established

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

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

It has been established that both alternatives can be mitigated to an acceptable level by employing the proposed mitigation and management measurements. It is therefore concluded by the EAP, that the project achieves sustainability and that no fatal flaws has been identified by the various specialist investigations and assessment of impacts.

Conditions that must be included in the authorisation

1. Specific conditions to be included into the compilation and approval of EMPr

To be populated in the Final EIA Report

2. Rehabilitation requirements

To be populated in the Final EIA Report

h) Period for which the Environmental Authorisation is required.

20 years

i) 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.

j) Financial Provision

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

i. Explain how the aforesaid amount was derived.

Refer to the mine closure and rehabilitation plan was details

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

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

Refer to the mine closure and rehabilitation plan was details

k) Deviations from the approved scoping report and plan of study.

i. Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

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

N/A

Motivation for the deviation.

l) Other Information required by the competent Authority

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:-

m) Other matters required in terms of sections 24(4)(a) and (b) of the Act.

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

Refer to the risk impact assessment section above for both alternatives

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.

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: Mr. Vernon Siemelink/Mr. Henno Engelbrecht

Tel No.: 012 807 0383/ 072 196 9928

Fax No. : **N/A**

e-mail address: vernon@ecoelementum.co.za

Table 86: Details of the EAP

Name	**Vernon**
Surname	Siemelink
Company	Eco Elementum (Pty) Ltd
Position	Director – Senior Environmental Consultant
Location	The Willows Office Park, Die Wilgers, Pretoria
Email	vernon@ecoelementum.co.za
Telephone Number	072 196 9928/ 012 348 5214
Education	**MA(EnvMan) - Masters in Environmental Management** Master's Degree at University of Pretoria in Pretoria, South Africa (Gauteng) **BSSc. GeoScience - Honours in Geographical Science** Honours Degree at University of Pretoria in Pretoria, South Africa (Gauteng)
Professional skills	Vernon Siemelink is a Director at Eco Elementum (Pty) Ltd Environmental and Project Management Professionals and has been involved in the field of environmental science and environmental management for the past 9 years. Vernon is a SGS IRCA Certified EMS Lead Auditor and a SETA accredited assessor. He has also completed the CEM auditor conversion training for ISO 9001, IS O 14001 and OHSAS 18001 Integrated Management Systems. Vernon Siemelink has been an environmental consultant and professional since 2008, specialising in the fields of: ▪ Environmental Impact Assessments and Authorisations; ▪ Water use license application ▪ Waste use license application ▪ Environmental Monitoring and Control; ▪ Mine Closure and Rehabilitation; ▪ Environmental Compliance and Audits; ▪ Environmental Management Systems; and Specialist Impact Studies During this time, he has provided quality, environmental, and health and safety consulting and auditing services in nearly every industry sector. Furthermore, Vernon holds a Master's Degree in Environmental Management and an Honours Degree in Geosciences from the University of Pretoria.

Please refer to the CVs attached in Appendix A.

Table 87: Expertise of the EAP

Skills	**Environmental Impact Assessments** **Basic assessments, WULA reports** **Water use license application** **Waste use license application** **Prospecting and Mining Right Authorizations** **Environmental Management Plans** **Public Participation** **Environmental Authorizations** **ISO 14001:2004 Environmental Management System Auditor** **FSC Forest Management Auditing** **Geographic Information System Support (ArcGISv9.2)** **SETA Accredited Assessor** **EMSware software Administrator** **Integrated Management System Auditor**
EAP Experience	Mr. Vernon Siemelink has been an Environmental Assessment Consultant for 9 years, during this time he has conducted S/EIA's, Basic Assessments, rehabilitation planning, developed EMPr (This includes conducting screening and scoping exercises, baseline studies, impact assessments, monitoring, and management planning and implementation) environmental legal assessments, ISO 14001:2004 management systems, due diligence, EMPr Performance Assessments and Integrated Water Use License Audits for clients in nearly every industry sector.

In terms of section 13 (2&3) of the 2014 National Environmental Management Act EIA regulations (GNR. 982 of 2014): In the event where the EAP or specialist does not comply with sub regulation (1)(a) (which is the independence clause), the proponent or applicant must, prior to conducting public participation as contemplated in chapter 5 of these Regulations, appoint another EAP or specialist to externally review all work undertaken by the EAP or specialist, at the applicant's cost. The external reviewer however needs to be independent.

Please refer to Appendix A for the detailed CV's.

Description of the Aspects of the Activity (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

YES

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 should be avoided, including buffers)

Refer to Annexure 4

Description of Impact management objectives including management statements

ii. **Determination of closure objectives. (ensure that the closure objectives are informed by the type of environment described in 2.4 herein)**

Due to the relatively close proximity of the proposed coal mine to surface water resources (wetland) and the potential impacts on surface water resources, rehabilitation must be conducted in such a way that pollution of the surface water resource is prevented / minimised. Where possible, rehabilitation must be planned to promote free drainage in order to minimise or eliminate ponding of storm water on sponge areas and thereby increase the risk of AMD decant.

The following rehabilitation and closure objectives will be applicable for the effective and efficient long-term management of residual impacts:

Table 88:Management Measures as per Management Objectives – Closure Phase

Environmental Aspect	Closure Objective
Topography	To ensure that the final elevation will result in the continuation of the pre-mining surface drainage pattern
Soil, Land Capability and Land Use	• To ensure that soil types are replaced in correct sequence, subsoil followed by topsoil, and at appropriate depths. • To ensure post-mining land capability is at least similar to pre-mining which is grazing and some arable lands. • To ensure that the land capability is self-sustaining. • To ensure that pre-mining land uses can continue.
Surface Water	To ensure that no dirty water from the site enters the surrounding surface water systems. To maintain flow in downstream rivers to prevent deterioration of ecological status.
Groundwater	To ensure that possible plumes originating from the mining areas do not impact significantly on the surface water features or surrounding users' boreholes. To ensure that groundwater users that are impacted have alternative sustainable water sources of the similar quality and quantity
Terrestrial (Fauna and Flora)	TO ensure that vegetation growth and cover on the rehabilitated areas is sustainable. To ensure that alien invasive growth is eradicated until the closure certificate is granted. To encourage surrounding animals to return into the rehabilitated areas to maintain the surrounding biodiversity.
Aquatic Ecosystems	To ensure that aquatic ecosystems are maintained as close as possible to that of the pre-mining environment
Wetlands	To minimise the disturbance on wetlands. To ensure that the adjacent wetland conditions are similar to that of the pre-mining Present Ecological State.
Heritage	To retain visual and areas of high heritage and archaeological value

The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

Potential risk of Acid Mine Drainage. (Indicate whether or not the mining can result in acid mine drainage).

The potential contaminants that may emanate from the mining activities are acid rock drainage which are normally Ca, Mg, Cl and SO4 with mobilization of metals at low pH. There may be possible acid generation. This can be confirmed or disproved by performing geochemical sampling and analysis as well as constructing a geochemical model

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

The Geohydrological Assessment (GeoPollutions, 2018) identified the following potential sources of ACD including the groundwater vulnerability

Table 89: Potential Sources of AMD

Potential sources	Primary or Secondary	Waste material	Potential leachate	Acid generation potential	Available monitoring points	Groundwater vulnerability
Plant area	Primary	Carbonaceous material	ARD (Sulphates & Metals)	Yes	No	Medium
Product Stockpile	Primary	Carbonaceous material	ARD (Sulphates & Metals)	Yes	No	Medium
ROM Stockpile	Primary	Carbonaceous material	ARD (Sulphates & Metals)	Yes	No	Medium
Underground	Secondary	Carbonaceous material	ARD (Sulphates & Metals)	Yes	No	Medium

Table 90:Pathways and Receptors

Potential sources	Transport mechanism	Exposure pathway	Available monitoring points	Potential receptors	Available monitoring points	Pathway complete	
						Yes/No	Current/Potential in future
Plant area	Leaching and Groundwater Transport	Surface water & shallow groundwater	No	Groundwater resource, Wetlands and streams	No	Yes	Yes
Product Stockpile	Groundwater Transport and Decant	Surface water & shallow groundwater	No	Groundwater resource, Wetlands and streams	No	Yes	Yes
ROM Stockpile	Groundwater Transport and Decant	Surface water & shallow groundwater	No	Groundwater resource, Wetlands and streams	No	Yes	Yes
Underground	Leaching and Surface Water	Shalllow & deep aquifer	No	Groundwater resource, Wetlands and streams	No	Yes	Yes

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

- The discard dump as well as other dirty water systems will be designed with liners to protect groundwater resources
-

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

- Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements
- The monitoring as recommended in the report should be established prior to operation (as per the Map below)
- Additional geochemical analyses should be conducted on overburden material and coal material during operations.
- Discharging mine water can be treated with a lime trench to raise the pH and remove metals.
- The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts.
- Update the numerical and geochemical model against monitored data during operations.

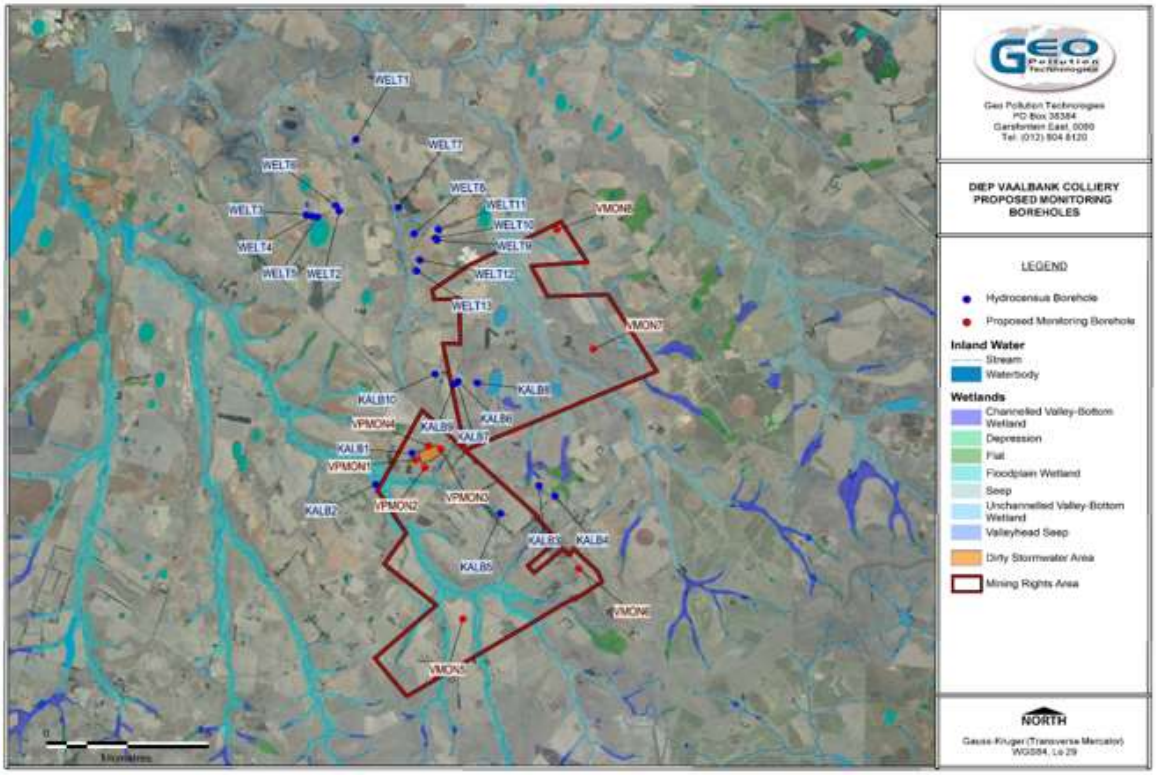


Table 91:Proposed Monitoring Boreholes

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

- A detailed mine water balance must still be undertaken

Has a water use licence has been applied for?

- Concurrently in process.

Impacts to be mitigated in their respective phases

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

Table 92: Impacts to be Mitigated in their Respective Phases

Activity	Impact	Applicable Mine Phase	Scale	Mitigation Measures	Compliance With Standards	Time Period For Implementation
• Site Preparation/Clearance • Establishment and erections of all infrastructure areas • Vehicular movement	Loss of agricultural land and/or Loss of grazing lands	Construction Operation	60 ha	**Land Use and Land Capability** **Construction & Operation** • Minimise the surface disturbance footprint of the project • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure **Closure** • Land rehabilitation should at least aim to restore the areas disturbed to a grazing capacity of 5 to 6 ha/LSU or even better. • Closure phase to include the maintenance and aftercare of final	NEMA MPRDA CARA NEMWA	Material handling will be conducted as per the soil utilisation guide and EMP from the onset for the life of mine to ensure preservation for rehabilitation.
	Fragmentation of natural habitat	Construction	60 ha		NEMA MPRDA CARA NEM:BA Conditions stipulated in licenses/rights/permits.	Demarcate infrastructure area and fence off before any activity takes place and maintain these for life of mine. Rehabilitate areas completely as soon as activity in those areas ceases.
	Increased faunal (and avi-faunal) mortalities	Construction Operation	Local area			

				rehabilitated land. In this regard, frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed. In the event that vegetation has not re-established and erosion gullies have developed, remedial action should be taken • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource • Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed areas to beneficial uses as quickly as possible **Faunal**		

				Construction • Sensitive areas and areas not included in the mining boundary should be cordoned off • Human activities should be kept out of the natural areas and animals prevented from entering the operation. A control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. • Employees and Contractors must be made aware of the Animals Protection Act, 1962 (Act No. 71 of 1962) as amended which deals with the prevention of animal cruelty. • Ensure that animals are not trapped in excavations by regularly checking these and removing animals found to a save environment, this includes snakes. Close monitoring of animal communities to ensure that biodiversity is restored and self-sustaining. Reports on this should be written annually and be made available at all times.		

				• A management plan needs to be implemented for the relocation of endangered (or any) faunal life that need to be relocated, in an ongoing process until end of closure phase. • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure phases • A biodiversity baseline assessment should be conducted. Once this data is available, annual biodiversity monitoring (in line with the biodiversity monitoring plan) of areas both affected and unaffected by activities should be initiated to determine the annual fluctuation in species numbers and, if necessary, relate this to activities on site. To his effect, a Biodiversity Action Plan (BAP) is highly recommended It is recommended that large trees are marked prior to clearing to ensure they are not damaged. **Operational** • Seasonal visual assessment of areas to determine if vegetation in		

				undisturbed areas is being impacted. • Continue with alien invasive monitoring, eradication and control programme. • Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase. • Rehabilitation should take place concurrently with the prospecting and mining activities. • Close monitoring in terms of the biodiversity monitoring plan of plant communities should be done to ensure that ecological balance is restored and the environment is self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary **Closure** • To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled,		

				removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees. • Activities on site must comply with the regulations of the Animal Protection Act 1962 (Act No. 71 of 1962). Workers should also be advised on the penalties associated with the needless destruction of wildlife, as set out in this act. • Ensure that an acceptable aesthetic scenario is created post closure. This will be reached through adequate rehabilitation practices by restoring damaged and degraded habitat areas. • When closure is considered successful and rehabilitation complete, unnecessary fences should be lifted to restore larger foraging areas, especially for larger mammalian species within the area • A management plan for control of invasive/exotic plant species needs to be implemented. This will be ongoing until the end of the mining closure phase. The mine will be held accountable in this regard.		

				• A rehabilitation plan should be implemented. This includes the return of the topsoil and the process of replanting the vegetation. It is recommended that the replacement of the topsoil is done with the assistance of a soil scientist. The topsoil should also be tested closer to the rehabilitation phase to ensure that the soil is of an adequate quality. The post-closure rehabilitation plans should be adopted according to the necessary actions needed during the final stage of the life of the mine. The focus of the rehabilitation plan would be to deliver the best overall environmental, economic and social outcomes. • Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted every six months by the environmental practitioner. A report should be written and stored to be made available and should be available at all times.		

				• The use of the farm for conservation purposes post-closure of the mine is very low. Therefore, a possible use after rehabilitation would be to utilize it for grazing purposes. For grazing to be efficient, a veld management expert should be employed to develop a veld management programme for the area. This should be done long before rehabilitation is started, especially before the replacing of the soil, to ensure that an adequate and realistic programme is implemented. A possible method for reseeding should be to sow many pioneer species during the first process that will become established more easily. It will make the area suitable for other species to also become established. Therefore, a successional process should be followed. • Ensure awareness amongst all staff, contractors and visitors to the site to not needlessly damage flora. • Rehabilitate surrounding area with natural, indigenous vegetation as		

			much as possible, consulting with specialists as to the most appropriate methods. • Re-vegetation of al degraded areas and bare patches is advised to speed recovery to natural, self-sustaining state as soon as possible		
Disruption/alteration of ecological life cycles	Construction Operation	60ha	**Construction** • Minimise the surface disturbance footprint of the project • Sensitive areas and areas not included in the mining boundary should be cordoned off • Human activities should be kept out of the natural areas and animals prevented from entering the operation. A control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. Ensure awareness among staff, and management systems should be set in place to prevent any form of additional disturbance from occurring.	Standards and principals of reduced light, dust and noise pollution have been considered. Conditions stipulated in licenses/rights/permits.	**Measures in place from the start and continue throughout LOM.**

				• Ensure that animals are not trapped in excavations by regularly checking these and removing animals found to a save environment, this includes snakes. Close monitoring of animal communities to ensure that biodiversity is restored and self-sustaining. Reports on this should be written annually and be made available at all times. • A management plan needs to be implemented for the relocation of endangered (or any) faunal life that need to be relocated, in an ongoing process until end of closure phase. **Operational** • Compile a Soil Management Plan (SMP) to ensure the protection of soils and maintenance of the terrain during the construction, operations, decommissioning and closure phases • A biodiversity monitoring plan should be implemented prior to mining commencing • It is recommended that large trees are marked prior to clearing to ensure they are not damaged.		

				• Seasonal visual assessment of areas to determine if vegetation in undisturbed areas is being impacted. • A biodiversity baseline assessment should be conducted. Once this data is available, annual biodiversity monitoring of areas both affected and unaffected by activities should be initiated to determine the annual fluctuation in species numbers and, if necessary, relate this to activities on site. To his effect, a Biodiversity Action Plan (BAP) is highly recommended • Continue with alien invasive monitoring, eradication and control programme. • Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase. • Rehabilitation should take place concurrently with the prospecting and mining activities. Close monitoring of plant communities should be done to ensure that ecological balance is restored and		

				the environment is self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary **Closure** • A management plan for control of invasive/exotic plant species needs to be implemented. This will be ongoing until the end of the mining closure phase. The mine will be held accountable in this regard. • Rehabilitation of degraded areas is a must • Rehabilitation plan should be implemented. This includes the return of the topsoil and the process of replanting the vegetation. The replacement of the topsoil should be done with the assistance of a soil scientist. Topsoil should be tested closer to the rehabilitation phase to ensure that the soil is of an adequate quality. The post-closure rehabilitation plans should be adopted according to the		

			necessary actions needed during the final stage of the life of mine. • The use of the farm post-closure should be grazing. The veld management plant that was created by the veld management expert should be thoroughly implemented. • Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted every six months by the environmental practitioner. A report should be written and stored to be made available and should be available at all times.		
Loss of wetland habitat and functionality, decreased PES score	Construction, Operation, Decommissioning Rehabilitation	60ha + CMA	***Construction*** • A water use license authorisation in terms of section 39 or 40 of the National Water Act, 1998 (Act No. 36 of 1998) for the Section 21(c) and (i) uses must be applied for (approval is needed prior to the undertaking of any activities related to the wetland areas) • In terms of Section 40 of the National Water Act, 1998 (Act No.	• South African Constitution • NEMA • NWA • National Water Resources Strategy (DWS, 2013) • South African Water Quality Guidelines	Rehabilitation plan must be in place from the start of the project. Full impact to wetlands can be finalised through monitoring during LOM and a remediation plan detailed during

				36 of 1998), a WULA and Environmental Risk Assessment (ERA) must be submitted for all activities within 500 m of a wetland • Maintain a minimum of a 100 m buffer zone around the wetland areas wherein no surface mining or related activities are allowed to take place. (Figure 41) • This buffer zone should be clearly demarcated as a "NO GO" area to prevent any accidental entrance into the area • Undermining can be considered pending the outcome of the Geotechnical Assessment. • Minimise the surface disturbance footprint of the Diep Vaalbank Coal Project • All affected areas must be air rated by means of ripping or ploughing and re-vegetated asap. • An ecological sensitive stormwater management plan should be implemented • Storm water needs to adhere to RQO's, none acidic and treated prior to discharge	• NEMBA • NEMPA • NHRA	operational phase or as

			• Storm water to be contained or augmented in bio retention pond prior to outlet to the wetland system • Storm water diversion must take place upstream of the site should form part of the SWMP • Stream-bank at dam spillway and downstream of dam to be well protected against flood damage and erosion • Storm-water management practices must be applied and incorporated into management with the aid of a suitably qualified engineer to avoid disposal or spillage of any environmentally harmful materials or waste into the wetland. • Construction should also be undertaken during the dry season. • All no-go areas must be demarcated and the ECO on site should ensure that any spills are immediately reported and cleaned. Furthermore, all machines should be properly maintained and drip trays are to be placed under all		

				equipment over night or when not working. • Riparian areas must be demarcated and protected as far as possible and if impacted, it must be rehabilitated before the wet season. • Impacted wetland systems earmarked for mining to be replaced with offset strategy • Wetland crossing to be designed by a civil engineer. The plan should cater for specie migration, ensure that flooding doesn't lead to erosion • A Plant Species Plan will ensure that Alien Invasive Species are controlled all while the promotion of endemic species taking place. • Wetland Functionality will have to be monitored on a continuous basis to ensure that no degradation takes place. A Rehabilitation Plan will need to be drafted and implemented in an attempt to ensure no impact is allowed to manifest in the areas • Disturbed areas must be effectively managed to prevent deep gully		

				incisions that eventually contributes towards soil erosion problems. • Prepare an appropriate wetland management plan which include rehabilitation strategies for the LOM • A Zero effluent discharge policy (no discharge to dam or stream) is required Strict regulatory control on all water containing waste generated and disposal of effluent (from the sewerage treatment plant on site) ***Operational*** • Rehabilitate degraded areas, including the re-establishing of biodiversity and the restoration of key processes. • Maintain physical, chemical and biological processes in freshwater wetland areas. • Control and where possible eliminate alien/invasive biota to facilitate re-establishment of natural biodiversity pattern and process in invaded areas.		

				• Strive towards re-establishment of biodiversity patterns and process in degraded land. • Remove alien vegetation in freshwater wetland areas. • Prevent or minimise development within freshwater wetlands. • Establish the distribution and density of invasive species. • Prioritise areas for alien removal focusing on biodiversity restoration. • Implement removal programs for priority species and areas (alien plants, mobile dunes). • Investigate options for the control of alien species (e.g. biological control). • Encourage and facilitate natural recovery of transformed areas • Dirty water to be collected at the station drains and sumps • Clean water diversion (bunds/ canals) to be implemented. • Good housekeeping (clean-up of spills and minimise informal storage of materials) • Leak detection through inspection		

				• Good housekeeping (maintenance of equipment) • Storm water diversion upstream of the facilities should form part of the SWMP • Either run off will be contained in paddocks for collection and evaporation or run off will be captured in the drain system and channelled to the PCD compartment. • Monitor seepage at PCD on a quarterly basis • Isolate pollution sources with roofs, concrete bases, traps, sumps and bund walls (e.g. diesel/petrol storage, wash bays and workshops) • Roads should be surfaced or sealed with a biodegradable product Vehicle maintenance must be conducted on bunded concrete surfaces ***Closure*** • Once the site has been cleared of infrastructure and potential		

				contamination, the slope must be re-graded (sloped) in order to approximate the pre-project aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles. • The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. • Undertake maintenance and aftercare of final rehabilitated land. Frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed • All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site. Once the land has been prepared, seeding and re-vegetation will contribute to establishing a vegetative cover on disturbed soil as a means to control erosion and to restore disturbed		

				areas to beneficial uses as quickly as possible		
	Altering of natural hydrological regimes	Construction Operation	60ha+catchment	Refer to Mitigation measures under Loss of wetland habitat and functionality, decreased PES score		

Activity	Impact	Applicable Mine Phase	Scale	Mitigation Measures	Compliance With Standards	Time Period For Implementation
Boxcut excavation and blasting **25 ha**	Faunal Displacement and Mortality	Operation	60ha-100ha	As per mitigation above	CARA NEMBA Animal Protection Act	
	Altered hydrological regime	Construction Operation	60 ha + catchment	Surface water (refer to mitigation measures above) **Soil Management** Construction • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained by using a drip tray with plastic sheeting filled with absorbent material; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and	NWA:GN704. CARA MPRDA Conditions stipulated in licenses/rights/per mits.	ALL water management features will be completed before other activities commence on site and maintained for the life of mine. Rehabilitate areas completely as soon as activity in those areas ceases and establish erosion control measures as soon as erosion is observed on site. Surface water monitoring and biomonitoring will continue for life of mine to ensure water management is effective.
	Deterioration of water quality of surface water resources (wetlands and rivers) due to runoff of contaminants into the environment.	Construction, Operation, Decommissioning	60 ha + catchment			
	Soil erosion and sedimentation of water resources	Construction, Operation,	40 ha + catchment			

				• Cleaning up areas of spillage of potentially contaminating liquids and solids.
				• The SMP must:
				  o Address the prevention, minimisation and management of erosion, compaction and chemical soil pollution during construction, operations, decommissioning and closure;
				  o Define requirements and procedures to guide the Project Management Team and other project contractors;
				Define monitoring procedures
				
				Operational
				
				• Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from blasting and waste rock stockpiles and the dampening for dust control with contaminated water are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately.
				• Stockpiles must be managed so they do not become contaminated and then need additional handling or disposal;
				• A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled;		

				• Processing areas should be contained and systems designed to effectively manage and dispose of contained storm water, effluent and solids; • Storage tanks of fuels, oils or other chemicals should be stored above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. • Storage tanks of fuels, oils or other chemicals must be bunded by 110% to mitigate for unforeseen accidents and spillages;. • Above-ground (rather than in-ground) piping systems should be provided. Containment bunds should be sealed to prevent spills contaminating the soil and groundwater; • Equipment, and vehicle maintenance and washdown areas, must be contained and appropriate means provided for treating and disposing of liquids and solids; • Air pollution control systems will help avoid release of fines to the ground (such as dust from dust collectors or slurry from scrubbing systems); • Solids and slurries should be disposed of in a manner consistent with the nature of the material and avoids contamination; and • Effluent and processing drainage systems must be installed to avoid leakage to ground • Chemical soil pollution should be minimised as follows:		

				○ Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material ○ Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids and recovering contaminated soils and treating them off-site; ○ Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; ○ Containing potentially contaminating fluids and other wastes; and ○ Cleaning up areas of spillage of potentially contaminating liquids and solids. • Losses of fuel and lubricants from the oil sumps of vehicles and equipment should be contained using a drip tray with plastic sheeting and filled with absorbent material;		

	Establishment of more competitive alien and invasive plants including riparian areas associated with wetlands areas	Construction, Operation, Decommissioning g & Post-closure	40 ha + catchment	An alien and/or invasive plant (AIP) monitoring program should be in place which incorporates control and eradication measures;	CARA NEM:BA.	An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.
	Dust and Noise nuisance	Construction, Operation, Decommissioning g	60ha	**DUST** **Construction and Operation** ▪ Topsoil should not be removed during windy months (August to January) due to associated wind erosion heightening dust levels in the atmosphere. ▪ Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur. ▪ Topsoil should be re-vegetated to reduce exposure areas.		

				▪ 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. ▪ Stockpiles should not be left for prolonged periods as wind energy generates erosion and causes more dust to form. ▪ Emissions generated by wind are dependent on the frequency of disturbance of erodible surfaces and by covering the stockpiles with vegetation would reduce the negative erosion effect. ▪ Any crusting of the surface binds the erodible material. ▪ All stockpiles to be damped down, especially during dry weather or re-vegetated (hydro seeding is a good option for slope revegetation). ▪ Successful trialling of broad acre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop, providing an established vegetative stabilisation to minimise the potential for windblown dust generation.		

				▪ Constricting the areas and time of exposure of pre-strip clearing in advance of mining development. ▪ Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed thus increasing the moisture content. ▪ Blasting should also not take place when poor atmospheric dispersion is expected i.e. early morning and late evening. ▪ Another option would be to time the blasting with wind to ensure the dust will not be blown to the sensitive receptors or especially the community. ▪ Material need to be removed to dedicated stockpiles to be used during rehabilitation. ▪ This hauling of materials should take place on roads which is being watered and/or sprayed with dust suppressant. ▪ To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. ▪ Constricting the areas and time of exposure of pre-strip clearing in advance of construction to limit exposed soil surfaces ▪ Hauling of materials and transportation of people should take place on roads which		

				is being watered and/or sprayed with dust suppressant. ▪ To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. ▪ In order to mitigate the impacts of the activity, the speed limit should be kept to the low as more dust will be generated at higher wind speeds. ▪ Speed limits need to be observed and adhered to. ▪ Management should fit roads with speed humps to ensure adherence. ▪ Application of wetting agents or application of dust suppressant to bind soil surfaces to avoid soil erosion. ▪ The drop heights should be minimised when depositing materials to the ground (during the process of closing voids and rehabilitation) ▪ Encourage car-pool and bulk delivery of materials in order to reduce the number of trips generated daily. ▪ Use of a global positioning system as a tool to track the locations of mining and dust suppression equipment (e.g. water carts) and cross-referencing this information with real-time weather monitoring to assist with dust control		

				▪ Use of water sprays at each contact or transfer point along the conveyance system which have adjustable rates of application (low, medium and high) depending on dust levels ▪ Use of a retractable telescopic chute with curtains to load coal into carriages/trucks ▪ A tree windbreak located downwind of the prevailing wind direction to minimise dust from the finished product stockpiles ▪ Topsoil handling and storage procedures including stockpile inventory, vegetative cover and signage to optimise rehabilitation and minimise wind erosion ▪ Successful trialling of a chemical dust suppressant on haul roads resulting in a considerable reduction in the amount of water used for dust suppression on haul roads ▪ Successful trialling of broadacre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop, providing an established vegetative stabilisation to minimise the potential for windblown dust generation ▪ Constricting the areas and time of exposure of pre-strip clearing in advance of mining development ▪ No low or in-pit dumping of overburden during high wind conditions ▪ Demolition should not be performed during windy periods (August, September and		

				October), as dust levels and the area affected by dust fallout will increase. ▪ The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. ▪ Speed restrictions should be imposed and enforced. ▪ Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. ▪ Exhaust pipes of vehicles should be directed so that they do not raise dust. ▪ Engine cooling fans of vehicles should be shrouded 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. ▪ Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. ▪ Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. ▪ Plants used for revegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be		

				adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings. ▪ The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. ▪ Spreading of soil must be performed on less windy days. ▪ The bare soil will be prone to erosion and therefore there is need to reduce the velocity near the surface of the soil by re-vegetation. ▪ Leaving the surface of the soil in a coarse condition reduces wind erosion and ultimately reduces the dust levels. ▪ Additional mitigation measures include keeping the soil moist using sprays or water tanks, using wind breaks. ▪ The best time to re-vegetate the area must be linked to the distribution and reliability of rainfall. ▪ Speed restrictions should be imposed and enforced. ▪ Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. ▪ Exhaust pipes of vehicles should be directed so that they do not raise dust.		

				▪ Engine cooling fans of vehicles should be shrouded 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. ▪ It is recommended that the rehabilitation by vegetating should begin during the operational phase already as the objective is to minimise the erosion. ▪ An exclusion zone for safe blasting was established to be at least 220 m. Normal practice observed in mines is a 500 m exclusion zone		
	Increased vehicular movements in and around the site	Construction, Operation, Decommissioning g	60ha	**TRAFFIC** • A traffic impact assessment must be conducted prior to mining commencing • The applicants should negotiate a chartered contract with existing minibus taxi or bus operators to transport the majority of the workers during the different stages of the development • The contractor is required to monitor the condition of the roads used and repair the road where it becomes damaged due construction traffic. • Access to site will be designed and constructed as per the engineered designs which will have to be • Set speed limits to be enforced.	• National Road Traffic Act, 1996 (Act No. 93 of 1996) • South African Constitution, 1996 (Act No. 108 of 1996) • National Land Transport Act, Act No. 5 of 2009	

				• All mine-related vehicles and contractor vehicles to be in road worthy condition. • Contractor is required to monitor the condition of the roads used and repair the road where it becomes damaged due to construction traffic • As above • All access roads must be signposted and speed limited to minimise transport noise. • Equipment with lower sound power levels would be used in preference to more noisy equipment. • All equipment used onsite will be regularly serviced to ensure the sound power levels remain at or below the levels used in the modelling to assess generated noise levels and compliance with the criteria. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads. • Ensure trucks and vehicles remain on roads and areas designated as a construction site to limit disturbance to areas unaffected by construction. • Ensure drivers are informed that off-road travelling is prohibited. • Ensure speed limits are set on all roads and enforce speed limits. Ensure all drivers at the site are informed about speed limits.approved by SANRAL and Roads Department. • All intersections with main tarred roads must be clearly signposted.		

				NOISE **Construction and Operation** • A baseline noise study must be undertaken prior to construction phase so as to determine the ambient noise levels • Noise reduction is essential and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc. • The use of silent compressors is a specific requirement. • Mining-related machine 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. • Barriers (in the form of a berm) should be installed between the noise source and sensitive noise receptor, as close to the noise source as possible. • The berm will help with the attenuation of noise produced by the mining activities. A basic rule of thumb for barrier height is: Any noise barrier should be at least as tall as the line-of-sight between the noise source and the receiver, plus 30%. So if the line-of-sight is 10m high, then the		

				barrier should be at least 13m tall for best performance. • Quarterly ambient noise monitoring must start during construction phase and continue throughout the life of mine. This will assist in formulating mitigation measures should complaints about noise be received from surrounding residents or communities. • Occupational noise levels should be measured and adequate PPE given to staff exposed to high noise levels. • Fixed noise producing sources such as generators, pump stations and crushers should be either housed in enclosures or barriers put up around the noise source if complaints about noise are received. • Equipment should be switched off when not in use. • Quieter equipment must be sought where feasible. • All project employees and contractors will be instructed to avoid the use of engine compression brakes when approaching the Mine entrance or driving through or in the vicinity of the towns close to the mine • 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 more noisy equipment. • All equipment used onsite will be regularly serviced to ensure the sound power levels remain at or below the levels used in the		

				modelling to assess generated noise levels and compliance with the criteria. • The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads. • The retention of as much existing vegetation as possible, specifically the existing mature trees in the area to conceal the mining activity as much as possible. Down-lighting should also be implemented to minimise light pollution at night		
	Deterioration in visual aesthetics and sense of place.	Construction, Operation, Decommissioning g	60ha + visual catchment	**CONSTRUCTION AND OPERATIONAL** Visual screens (vegetated berms, trees or wind breaks) will be considered where necessary. All berms and soil stockpiles will be vegetated. Apply dust control measures and other environmental measures to ensure impact area is contained. Apply good housekeeping practices.	Conditions stipulated in licenses/rights/per mits.	Good housekeeping practices and proper storage of materials in designated areas, from the onset of construction throughout the life of mine. Regular communications with I&APs.

Underground mining of coal including dewatering **5,867 ha MRA**	Impacts on groundwater volumes due to active dewatering of the underground mining area	Construction, Operation, Decommissioning Closure, Post Closure	5,867 ha MRA + max drawdown influence	Groundwater ***Construction and Operational*** • Before operation, a plan that includes explicit consideration of closure and rehabilitation issues must be prepared and approved. These plans should define the sequence and nature of operations and detail the methods to be used in closure and restoration. The plans as well as the numerical should be updated regularly (every 3 to 5 years) during operation with available monitoring data. • All operational planning and activities should be undertaken with eventual closure in mind, such that operations can end in a manner that minimizes the final risks and liabilities in the post-closure phase. • Water management facilities should be designed to intercept and contain as much contaminated runoff and/or seepage as	NEMA MPRDA South African Constitution, 1996 (Act No. 108 of 1996) NWA The National Water Resources Strategy (DWS, 2013) South African Water Quality Guidelines NEMBA Department of Water Affairs and Forestry (DWAF). (1998). Minimum Requirements for the Water Monitoring at Waste Management Facilities.	.
	o Altered hydrological regime o Long-term impacts on groundwater quality due to poor quality seepage from the mining area once water level has recovered	Operation. Decommissioning				

				possible. The following facilities should be lined: o Return Water Dam o Pollution Control Dam • Apply effective storm water management principles to ensure that clean runoff is maximised and diverted to the receiving water resource, while contaminated runoff is minimised and contained for reuse within the operation. • Apply passive water management measures within the operations that are aimed at minimising the potential for water quality deterioration due to the oxidation of sulphide minerals by reducing the available contact time between water and exposed sulphide minerals. • Monitoring boreholes as discussed in the following sections will be required in strategic locations near the pollution source, to obtain information on the groundwater regime as well as for future monitoring purposes. • Construct detailed water and salt balances that take account of climatic and operational variability, as a planning tool to ensure that all pollution control dams are adequately sized and that they are integrated into a robust water reuse and reclamation strategy to ensure that captured contaminated water is effectively reused within the mining operations and that system spillages to the environment are avoided.		

				• Proper storage, handling and monitoring of fuel and chemicals used on site to minimize the risk of spillages to the environment. • Institute detailed monitoring systems that are capable of detecting pollution at the earliest possible stage, at all facilities where significant pollution potential exists, in order that this can lead to rapid and effective management actions to address the pollution source and minimize it to the full extent possible. • Safety measures such as freeboard allowances etc. should be included in designs of storm water control facilities to allow for sufficient storage capacity and to ensure that risks of overflows or spillages are minimized and environmental impacts are therefore avoided. • Design, construct, maintain and operate any clean water system at the mine or activity so that it is not likely to spill into any dirty water system more than once in 50 years; • Design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years; • Design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an		

				average period of recurrence of once in 50 years. • Design and operate the MRDs to minimise the evaporative losses, e.g. by limiting the size of the supernatant pool on the MRD surface. • Identify and where possible, maximise areas of the mine that will result in clean storm water runoff (for example open veld areas) as well as infrastructure associated with the mine (for example office areas) and ensure that runoff from these areas is routed directly to natural watercourses and not contained or contaminated. • Ensure that clean storm water is only contained if the volume of the runoff poses a risk, if the water cannot be discharged to watercourses by gravitation, for attenuation purposes, or when the clean area is small and located within a large dirty area. This contained clean water should then be released into natural watercourses under controlled conditions. • Ensure the minimisation of contaminated areas, reuse of dirty water wherever possible and planning to ensure that clean areas are not lost to the catchment unnecessarily. • Ensure that seepage losses from storage facilities (such as polluted dams) are minimised and overflows are prevented. • Ensure that all possible sources of dirty water have been identified and that		

				appropriate collection and containment systems have been implemented and that these do not result in further unnecessary water quality deterioration. • Ensure that less polluted water or that: moderately polluted water is not further polluted. Where possible less and more polluted water should be separated. This will assist in the reuse water strategy and improve possibilities for reuse based on different water quality requirements by different mine water uses. • Where contaminants are transported along construction roads, emergency containment and mitigation measures must be developed to minimize impacts should accidental spillages occur along the transport routes. • Store all potential sources of contamination in secure facilities with appropriate Storm Water management systems in place to ensure that contaminants are not released to the water resource through Storm Water runoff. • Separate and collect all storm water that has a quality potentially poorer than the water quality specified and negotiated for the specific catchment into dirty water storage facilities for reuse within the mining operations. • Ensure that all storm water structures that are designed to keep dirty and clean water		

				separate can accommodate a defined precipitation event. (The magnitude of the precipitation event used in such an objective statement must, as a minimum, adhere to the relevant legal requirements.) • Route all clean storm water directly to natural watercourses without increasing the risk of a negative impact on safety and infrastructure, e.g. loss of life or damage to property due to an increase in the peak runoff flow. • Ensure that the maximum volume of clean water runoff is diverted directly to watercourses and the minimum amount of storm water reports to the pit floor of an open cast mine. • Develop and implement proper environmental management and auditing systems to ensure that pollution prevention and impact minimisation plans and measures developed in the design and feasibility stages are fully implemented. • The size of unrehabilitated areas (pit, spoils, unvegetated areas) that produce contaminated runoff should be minimised. • Rehabilitation should be planned to promote free drainage and to minimise or eliminate ponding of storm water. On-going rehabilitation as mining operations progress is required. • The clean and dirty water flow areas on a mine site should be identified.		

				• Every effort should be made to maximise the clean area and minimise the dirty area when locating the diversion berms, channels and dams. In the case of a new mine, the maximisation of the clean areas should have an influence in overall mine planning and the location of the mine infrastructure • All openings to the mine need to be sealed or have adequate berms surrounding the openings to prevent surface water entering. • All boreholes should be sealed from the bottom to the top to prevent groundwater entering the hole and feeding into the mine workings. • All depressions created by mining need to be profiled for self-drainage of surface water away from the workings. • Should depressions created by mining not be able to be filled, then the areas need to be surrounded by berms to prevent surface water ingressing the mine workings. • Where significant water ingress cannot be prevented, measures should be put in place to intercept ingress water as close as possible to the source in order that it can be pumped out of the mine before its quality can deteriorate through contact with sulphide minerals. • Properly mark all significant water ingress points encountered during mine construction and development and ensure		

				that their physical location, flowrate and water quality are recorded and incorporated into the existing groundwater model and the mine water and salt balance. • Properly seal all major water ingress points and ensure that the details of the sealing operation are recorded. • Ensure that all approved design measures are properly implemented and modify mine plans and drawings to indicate 'as-built' systems wherever they deviate from the original designs, together with motivations on the design variation. • Institute appropriate water level and water quality monitoring programmes to confirm rate of water rise and water quality as the mine floods. Maintain an ability to access the underground workings until long term discharge and quality predictions have been confirmed. • A particular concern when storing water underground where it is likely to be in contact with sulphide minerals is to manage the storage systems in a manner that absolutely minimizes the potential for water quality deterioration to occur. This would imply that storage reservoirs must be filled as quickly as possible and that measures must be put in place to prevent regular fluctuation of the stored water level as it is this wetting and drying cycle on the exposed surfaces that will enhance the		

				rate of sulphide oxidation and lead to water quality deterioration. • Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations and as feedback to stakeholders in the catchment, perhaps via the CMA. See the Monitoring Network section. • Areas that may have subsided or areas of depressions and/or sinkholes should be filled to create free draining surfaces. • Geochemical samples should be collected from the proposed stockpile and waste rock dump once in operation • The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts • A detailed mine closure plan should be prepared during the operational phase, including a risk assessment, water resource impact prediction etc. as stipulated in the DWA Best Practice Guidelines. • All sulphate containing waste material should be stored at the base of the underground mine and flooded as soon as possible to exclude oxygen.		

				• Major underground fractures encountered while mining must be sealed by grouting, both on inflow and outflow areas ***Decommissioning*** • Potentially contaminated mine water discharge should be captured using a pollution control dam. • Water quantity and quality data should be collected on a regular, ongoing basis during closure and decommissioning • The implementation of the mine closure plan, and the application for the closure certificate can be conducted during the decommissioned phase • Effective shaft closure techniques		

Activity	Impact	Applicable Mine Phase	Scale	Mitigation Measures	Compliance With Standards	Time Period For Implementation
All material stockpile areas	Erosion via wind and water leading to sedimentation and pollution of water resources	Construction, Operation, Decommissioning	Catchment	Refer to mitigation and management measures relating ot air quality and visual impact mitigation and management measures above Establish storm water control measures to ensure clean and dirty water separation and dirty water containment.	Water will be managed in terms of GN704. Surface water quality in neighbouring areas will be maintained close to baseline conditions or	

Cumulative dust, PM_{10} & $PM_{2.5}$ generation	Construction, Operation, Decommissioning	-	Upslope berms to divert clean water around the site of activity into natural drainage lines and internal channels to drain dirty water from the active footprint to lined PCD. Apply dust control measures as per dust management plan. Have clearly defined hauling routes/vehicle access areas. These areas should preferably be paved where possible or treated for dust suppression. All soil and overburden stockpiles must have top and toe perimeter berms to prevent soil wash out Shield visual impacts or divert clean water runoff from site. Rehabilitate all disturbed areas as soon as they are no longer required. Revegetate all bare soils.	RWQOs for pH, sulphate, iron, TDS and EC. Erosion control measures will be considered in terms of CARA and MPRDA regulations.	
Stockpiles will change the topographical nature of the area including sense of place	Construction, Operation, Decommissioning	Visual catchment		NEMA CARA MPRDA	Material handling will be conducted as per the soil utilisation guide and EMP from the onset for the life of mine. Coal will be removed on a continuous basis on a first-in-first-out basis once the first coal is extracted until final coal is

						removed from site.
Integrated discard and slurry dump **12.5 ha**	Uncontrolled runoff and spillages of dirty water into surrounding environment, leading to contamination of water resources	Construction, Operation, Decommissionin g, Closure, Post Closure	12.5 ha	Discard dump must have a suitable liner to protect groundwater resources. Apply dust control measures and storm water runoff management measures to ensure impact area is contained to dump area and all water runoff and seepage is contained. Install downstream monitoring boreholes and monitor for potential contaminated seepage. If needed install downstream cut-off trench and direct seepage to PCD. Apply good housekeeping practices and ensure all discard is placed only in designated dump area. Visual screens (vegetated berms, trees or wind breaks) will be considered where necessary. Construct the dump as per engineered designs and clad and vegetate integrated dump as it develops.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the dump foundations will be supervised by the engineer and as built designs completed and signed by engineer. The dump development will be monitored for the life of mine and audited against the engineered designs. Surface water. groundwater and biomonitoring will continue for life of mine.
	Long-term impacts on water quality due to poor quality seepage from the surface pollution source areas	Post Closure	12.5 ha + 400m plume			

	Dump will permanently alter the topographical nature of the area.	Construction, Operation, Decommissionin g, Closure, Post Closure	12.5 ha	Inspect for and treat spontaneous combustion by covering areas with fine subsoil to douse the combustion.		
	Potential for spontaneous combustion and associated emissions.	Operation	-			
Access and hauling along roads	Cumulative dust , PM10 & PM 2.5 generation	Construction, Operation, Decommissionin g, Rehabilitation	-	Apply dust control measures as per dust management plan. Have clearly defined hauling routes/vehicle access areas. These areas should preferably be paved where possible or treated for dust suppression. Conduct regular cleaning/sweeping of paved road surfaces to prevent the accumulation of dust. Conduct regular maintenance and checks for haul road surfaces. Immediate clean-up of any spillage. All material that is being transported should be covered during transport (where possible). Control the number of trucks on the road, weight of trucks and the travelling speed. Implement strict vehicle speed limits. Monitor dust and amend mitigation measures accordingly.	Dust fallout will be monitored and managed as per GNR827 and compared to	**Dust management plan must be in place at the start of the project and carried out through all phases of the LOM.**

Activity	Impact	Applicable Mine Phase	Scale	Mitigation Measures	Compliance With Standards	Time Period For Implementation
ALL coal handling (RoM coal stockpiling, Coal product stockpile and loading area, Crushing & Screening facilities, Processing plant) ~60ha	Cumulative dust , PM10 & PM 2.5 generation	Operation, Decommissioning g	-	Refer to mitigation and management measures in the tables above Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Coal stockpile and handling must be in designated areas with compacted base (Class-C barrier) and must form part of the dirty water footprint and drain to the PCD. Manage dust through water carts or sprinklers. All material that is being transported should be covered during transport (where possible). Control the number of trucks on the road, weight of trucks and the travelling speed. Implement strict vehicle speed limits. Trucks must not be overloaded. Keep all materials within properly prepared and designated areas and apply good housekeeping practices by keeping surface clear of all materials. Coal spillages must be cleared.	NEM:QA GN704. Conditions stipulated in licenses/rights/per mits.	.
	Impaired water quality from coal fines and dust generation being deposited into wetlands and rivers	Operation, Decommissioning	Catchment			
	Runoff and spillages of dirty water into catchment	Operation, Decommissioning	Catchment			

Water Supply and storage (potable and process)	Irresponsible use of water and water wastage.	Construction, Operation, Decommissioning	-	Saving water initiatives will be included in environmental awareness training. Utilise water on site responsibly. Record all water usage on site. Inspection of ALL water features for leaks and immediate repair.	Water characteristics of the environment and sources maintained close to baseline conditions within allowable use limits.	ALL water management plans will be completed before other activities commence on site and maintained for the life of mine. Surface water & groundwater monitoring and biomonitoring will continue for life of mine to ensure water management is effective.

Activity	Impact	Applicable Mine Phase	Scale	Mitigation Measures	Compliance With Standards	Time Period For Implementation
Dirty water trenches, PCD's & other surface water management **control measures**	Altered hydrological regime (flow) of the rivers and local catchment	Construction, Operation, Decommissionin g	Catchment	No dirty water area is within any 1:100 year flood lines. Refer to mitigation and management measures in the tables above	Water quality maintained close to baseline conditions for pH, sulphate. Iron, TDS and EC.	ALL water management features will be completed before other activities

	Environmental pollution due to uncontrolled runoff in to surrounding environment and water resources	Construction, Operation, Decommissionin g	Catchment	.		commence on site and maintained for the life of mine. Surface water & groundwater monitoring and biomonitoring will continue for life of mine to ensure water management is effective.
Ablutions, change house with conservancy tank	Environmental pollution due to increased sedimentation and chemical runoff into the surrounding environment.	Construction, Operation, Decommissionin g	Catchment	Conservancy tanks must be designed to have sufficient capacity. Conservancy tanks to be emptied weekly. Inspect and repair all aspects of the sewage facilities as needed, including any plumbing associated with the bathrooms and toilets.	Downstream water quality will be within background quality limits and compared to SANS 2011 drinking water quality guidelines for bacteria.	Install conservancy tanks and ablution facilities, before other activities commence in the area and maintain for their operational lifetime. Surface water monitoring, groundwater monitoring and biomonitoring will continue for life of mine.
	Potential contamination of surface water bodies with sewage and nutrient enrichment of aquatic environments.	Construction, Operation, Decommissionin g	Catchment			

Stores, workshops, washbays, Fuel storage & Hard park **~5 ha**	Environmental pollution due to hydrocarbon contamination into the natural environment	Construction, Operational	Catchment	Refer to above mitigation and management measures	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding	Hydrocarbons will only be stored on site once bunded areas are constructed. Storage and handling of hydrocarbons (including used hydrocarbons) will be managed in accordance with the
	Impaired water quality by hydrocarbon contamination on surface which could impact the environment through runoff and seepage.	Construction, Operational	~5 ha + catchment	Refer to above mitigation and management measures Spill kits must be available on site and personnel trained to utilise these to clear spills.	signage and access control. Surface water and groundwater quality in neighbouring areas will be maintained within SANS 241:2011 standards for hydrocarbons.	EMP as soon as hydrocarbons are brought to site for the life of mine.

Impact Management Outcomes

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

Table 93: Impact Management Outcomes

Refer to above table.

Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

Table 94: Impact Management Actions

Refer to above table.

iii. **Financial Provision**

3. Determination of the amount of Financial Provision.

d. Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.

- Refer to the Final rehabilitation, decommissioning and mine closure plan attached as Annexure 6

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

- Refer to the Final rehabilitation, decommissioning and mine closure plan attached as Annexure 6

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.

- Refer to the Final rehabilitation, decommissioning and mine closure plan attached as Annexure 6

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

- Refer to the Final rehabilitation, decommissioning and mine closure plan attached as Annexure 6

Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

- Refer to the Final rehabilitation, decommissioning and mine closure plan attached as Annexure 6

CALCULATION OF THE MINE CLOSURE QUANTUM							
Mine: Diep Vaalbank Coal Mine					Province: Mpumlanga		
Evaluators: Eco Elementum (Pty) Ltd					Date: March 2018		
General Information	Risk Class	High (A)					
	Environmental Sensitivity	Medium					
	WF 1: Nature of Terrain Weighting Factor	Flat 1.00					
	WF 2: Proximity to Urban Area Weighting Factor	Peri-Urban 1.05					
Component No	Main Activities Itemized Descriptions	[B] CPI Adjusted Master Rate	[A] Quantity	Units	[C] Multiplication Factor	[D] Weighting Factor 1: Nature of Terrain	Sub Totals [E = A*B*C*D]
		STEP 4.3	STEP 4.5		STEP 4.3	STEP 4.4	
1	Dismantling of processing plant and structures	R 13,46	50000,00	m3	1,00	1,00	R 672 947,73
2(A)	Demolition of steel buildings and structures	R 187,48	500,00	m2	1,00	1,00	R 93 739,05
2(B)	Demolition of reinforced concrete buildings and structures	R 276,28	500,00	m2	1,00	1,00	R 138 141,76
3	Rehabilitation of access roads	R 33,55	6000,00	m2	1,00	1,00	R 201 292,28
4(A)	Demolition and rehabilitation of electrified railway lines	R 325,62	0,00	m	1,00	1,00	R 0,00
4(B)	Demolition and rehabilitation of non-electrified railway lines	R 177,61	0,00	m	1,00	1,00	R 0,00
5	Demolition of housing and facilities	R 374,96	250,00	m2	1,00	1,00	R 93 739,05
6	Opencast rehabilitation including final voids and ramps	R 190 832,98	4,00	ha	0,52	1,00	R 396 932,59
7	Sealing of shafts, adits and inclines	R 100,65	500,00	m3	1,00	1,00	R 50 323,07
8(A)	Rehabilitation of overburden and spoils	R 131 037,33	0,00	ha	1,00	1,00	R 0,00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R 163 204,63	0,00	ha	1,00	1,00	R 0,00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R 474 023,59	0,50	ha	0,80	1,00	R 189 609,44
9	Rehabilitation of subsided areas	R 109 724,03	0,00	ha	1,00	1,00	R 0,00
10	General surface rehabilitation, including grassing of denuded areas	R 38 824,10	25,00	ha	1,00	1,00	R 970 602,50
11	River diversions	R 103 803,67	0,00	ha	1,00	1,00	R 0,00
12	Fencing	R 118,41	1000,00	m	1,00	1,00	R 118 407,23
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	R 39 469,08	25,00	ha	0,67	1,00	R 661 107,01
14	2 to 3 years of maintenance and after care	R 13 814,18	25,00	ha	1,00	1,00	R 345 354,41
15	Specialist study				1,00	1,00	R 0,00
						Subtotal (1 to 15 above)	R 3 932 196,13
	Subtotal 1		Weighting Factor 2			1,05	R 4 128 805,93
1	Preliminary and General				12% of Subtotal 1 if less than R100mil 6% of Sub Total 1 if more than R100mil		R 495 456,71
2	Contingency				10% of Sub Total 1		R 412 880,59
					Subtotal 2 (Subtotal 1 plus sum of management and contingency)		R 908 337,31
					Subtotal 3		R 5 037 143,24
					GRAND TOTAL (Subtotal 3 plus 14% VAT)		R 5 742 343,29

Figure 48: Calculation of Mine Quantum

Confirm that the financial provision will be provided as determined.

Financial Provision, to the amount of ***R5,742,343.29*** be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

Table 95: Monitoring Requirements

Aspect	Requirement
Surface Water	Quality monitoring against parameters as required by the IWUL. Sampled monthly for a five-year post-closure period.
Groundwater	Quality and depth monitoring of both the shallow and deep aquifers against the parameters required by the IWUL. Sampled quarterly for a five year post-closure period.
Erosion	This will take the form of developing a representative reference site on the disturbed footprints and undertaking visual and topographic assessments to determine erosion rate,

	using standard erosion monitoring techniques. This will be undertaken twice a year during the wet and dry season for a five year post-closure period.
Vegetation	Vegetation condition will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference site established in a similar ecotype, conducted annually for a five year post-closure period.
Bio-monitoring	Upstream and downstream of the mining activities. A long-term bio-monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within the mining area. Appropriate biological index will be included in order to quantify and classify the longer-term changes in biotic integrity, with monitoring being undertaken bi-annually to also consider seasonal variations.
Visual	Photographic records should be maintained together with findings, follow up actions and close out records as part of the Environmental Management System.

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

Monitoring of Impact Management Actions

Monitoring and reporting frequency

Responsible persons

Time period for implementing impact management actions

Mechanism for monitoring compliance

Table 96: Mechanisms for 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
Construction, Operation and Decommissioning Activities	Groundwater Quality	SANAS Standards As specified in Geo-Hydro Report	Independent Specialist	As specified in Geo-Hydro Report
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

Indicate the frequency of the submission of the performance assessment report.

As per NEMA EIA Regulations (GNR982 of 2014), a performance assessment/audit will be conducted by an external consultant throughout the life of mine at intervals stipulated in the EA. It is recommended to complete these audits annually. This is conducted to assess the adequacy and compliance to the EMP and the relevant legislation. As per NEMA, any amendments to the EMPr that may be required due to the performance assessment findings will be completed if necessary.

The Quantum of the Financial Provision must be reviewed on an annual basis,and submitted to the DMR.

In addition to the NEMA requirements, the IWUL will be audited as per conditions once this is obtained, at which time the site will also be audited against GN704. The IWWMP will be updated annually once approved.

Environmental Awareness Plan

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

The applicant shall ensure that employees and contractors are adequately trained with regard to the implementation of the EMP and environmental legal requirements and obligations. It is anticipated that Environmental awareness shall be targeted at all project involved personnel and also part time personnel shall be trained so that they are aware of environmental obligations by the time they visit the site. The environmental awareness practitioner will be appointed to conduct training during site establishment and will be responsible for how the site look like before the drilling and how it looks like after rehabilitation. This will be to ensure that the site has been restored to its original state or to an acceptable level.

The applicant is committed to identifying training needs and ensuring that all personnel whose work may create a significant impact upon the environment receive appropriate training. The Environmental Awareness Plan describes the training available and the manner in which environmental training needs are identified and continually reassessed.

Objectives and Aims

The Objectives of the Environmental Awareness Plan are to ensure that: -

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training.
- Procedures are established and maintained to make appropriate employees aware of:
    - The importance of conformance with SHEQ policy and procedures and the requirements of the EMS;
    - The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance;
    - Their roles and responsibilities in achieving conformance with environmental policy, procedures and EMS; and
- The potential consequences of departure from specified operating procedures.
- Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and/ or experience.

The Environmental Awareness Plan Aims at:

- Informing all personnel of environmental policies, procedures and programmes applicable to the mining activities;
- Providing job specific environmental training to ensure the protection of the environment;
- Promoting general environmental awareness amongst all employees; and
- Providing general training on the implementation of environmental actions.

The Environmental Awareness Training Programme will include:

- Training of the implementation of emergency procedures where necessary;
- Environmental induction for new employees;
- Code of conduct signed by all inducted employees; and

- Identification of environmental risks associated with each job and job specific training on addressing these risks.

Responsibilities
The responsibilities in terms of environmental awareness training lie with the Diepsoils Investments.

Identification of training needs
The identification of environmental training and development needs are derived from the analysis of role descriptions.
The following general and specific training needs have been identified at Diep Vaalbank Coal.

General Training:
- Environmental awareness training;
- Awareness of the Diep Vaalbank Coal SHEQ policy; and
- Awareness of environmental legislation or any other requirements Diep Vaalbank Coal subscribes to.

Specific Training:
- Awareness of significant environmental aspects associated with work activities;
- Awareness of environmentally related operational procedures that need to be followed when conducting work activities;
- Awareness of the potential consequences of not following environmentally related operational procedures; and
- Environmental legislative requirements of work activities.

General Environmental Awareness
General environmental awareness training forms part of the induction at Diep Vaalbank Coal. An employee will attend induction training and all contractor employees are required to undergo the general induction training should their work at the mine exceed a period of 1 week on site.

The training material encompasses information regarding the Diep Vaalbank Coal SHE Policy, charter and visions, the description of environmental impacts, namely air pollution, waste management, water management, land management and energy conservation, the importance of environmental legislation, key roles and responsibilities in terms of environmental management and the reporting of non-conformances

Evaluation of the Environmental Awareness Plan
The effectiveness and efficiency of this plan will be monitored by the performance of annual audits aimed at testing the environmental awareness of employees directly and the analysis of the root causes of environmental incidents, including non-conformance to legal requirements, to determine which incidents were caused by a lack of environmental awareness and training. The evaluation of the Environmental Awareness Plan will be conducted by the Environmental Department. This evaluation will entail the auditing of the operation during the construction and operation phase once the activity has commenced.

The Environmental Awareness Plan described above is sufficient to make all those involved with the project aware of those risks that may occur as well as the necessary mitigation required to minimise these risks. This awareness plan displays that the Diep Vaalbank Colliery is serious about the environment's well–being, empowerment of the local people and returning the land to appropriate use once the reclamation activities have been completed

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

Emergency Response Plan

The EMP and other management options are intended to minimise all environmental risks as far as possible. Should there for some reason is unforeseen circumstances that might lead to unacceptable risks, emergency systems and procedures have been especially designed for this operation and is to be adhered in the case of such emergencies. The environmental emergency contingency plan addresses any reasonably anticipated failure (most probable risk) for the entire mining area and focuses on incidents that could cause

environmental emergencies. As with any system, the most important and critical component is the identification and communication with the Responsible personal. Consequently, the contact information for these role-players should be available around the facility and be updated on a regular basis. In addition to this, first-party employees (such as security, safety superintendents, mine overseers, environmental officers) will be trained to respond to the responsible personnel in the event of an emergency

Table 97: Emergency Response and Preparedness Plan

POSSIBLE ENVIRONMENTAL RELATED EMERGENCY	ACTION PLANS / REMEDIATION	TIME / PERIOD	RESPONSIBLE PERSON / PARTY
Hydrocarbon Spill (diesel, oil, grease, etc)	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. The Environmental Management Representative will have the contact details of companies that provide this service.	Immediately	Immediate Supervisor
Veld Fires	The mine management team must ensure that trained personnel are appointed and that firefighting equipment is in serviceable order. The responsible person must ensure that fire breaks are maintained. The responsible person must undertake periodic inspections of firefighting equipment. In the event of a fire on site the fire master and firefighting crew must immediately respond and in instances where the mines firefighting team is unable to control the fire, the services of the local municipal fire brigade must be called in. The fire master is responsible for ensuring that adequate arrangements are made with the local municipal fire brigade to ensure timeous response to veld fires.	Ongoing	Fire Master / Safety Officer
Explosions	Alternative evacuation routes should be identified and used, should the exit to the mine be blocked. Alternative air supply routes should be identified and implemented. All relevant emergency response units must be notified and hospitals informed of potential incoming patients. The Environmental Management Representative will assess the situation from the information provided and set up an investigation team or relevant personnel. This team may include the Operations Manager, Chief Safety Officer, the employee who reported the incident and the individual responsible for the incident.	Immediately	Mine Manager

Pollution Control Dam Overflow	Stop all pumping from underground if this is compounding the problem. Pump the water from the overflowing dam to any other dam that is not full, preferably one of the underground water containment areas. Pump as much water as possible into the underground containment areas to increase the capacity of the surface dams to contain run-off water. Monitor the spillway for erosion of the dam wall. If erosion occurs, reinforce the wall with sandbags.	Immediately	Plant Manager
Pollution Control Dam Breach	Prevent overflow from the adjacent dam by sandbagging the overflow point. Stop all pumping from underground. Pump remaining water in the breached into the underground water containment areas or into the other pollution control dams. Pump as much water as possible into the underground containment areas to increase the capacity of the surface dams to contain run-off water.	Immediately	Plant Manager
Berm Breach / Drain Overflow	Where there has been overflow due to a blockage, the drain must be cleaned as soon as possible. Where the overflow is the result of a lack of capacity the dimensions of the drain must be increased. A breached berm must be repaired as soon as possible. The dimensions of a breached berm must be increased to prevent a recurrence.	Immediately	Manager / Plant Manager
Leakage or spill from the chemical toilets and associated infrastructure.	The failure of the chemical toilets and associated infrastructure poses a threat to both groundwater and surface water resources. In the event of a failure, the following procedures must be followed: The incident must be reported to the Environmental Management Representative immediately. An investigation team, set up by the Environmental Management Representative must investigate the cause of the failure. Precautions must be taken to prevent the spread of any contaminants/material, especially into surface water courses. Repairs must be commissioned as soon as possible, followed by an inspection to determine if repair work was efficient, and to detect any overlooked or future potential issues.	Immediately	Environmental Management Representative

	The failure must be recorded and inspected during the routine maintenance of the sewerage plant and associated infrastructure. The affected environment must be suitably rehabilitated, or cleaned up		
Subsidence	Alternative evacuation and access routes should be identified and used, All relevant emergency response units must be notified and hospitals informed of incoming patients.	Immediately	Operational Manager/SHE Coordinator

Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

UNDERTAKING

The EAP herewith confirms

e. the correctness of the information provided in the reports ☐

the inclusion of comments and inputs from stakeholders and I&APs ; ☐

the inclusion of inputs and recommendations from the specialist reports where relevant; ☐ and

the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☐

-END-