ENVIRONMENTAL & ENGINEERING

REPORT

DIEP VAALBANK COAL - MINING RIGHT APPLICATION

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR DMR SUBMISSION

REPORT REF: MP 30/5/1/2/2/10187 MR

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

2018/05/02

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DOCUMENT AND QUALITY CONTROL

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Approved for Distribution:				
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Nature of Signoff:	**Responsible Person:**	**Role / Responsibility**	**Qualification**
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DECLARATION OF INDEPENDANCE

I, Vernon Siemelink, declare that;

- I acted as the independent specialist in this application;
- I have performed the work relating to the application in an objective manner, even if the results in views and findings that were not favourable to the applicant;
- I declare that there were no circumstances that have compromised 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 had relevance to the proposed activity;
- I have complied with the Act, regulations and all other applicable legislation;
- I have not engaged 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.

07/05/2018

Signature **Date**

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

EXECUTIVE SUMMARY

BACKGROUND

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 2017 (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 (EAP) have been appointed by Diepsoils Investments (Pty) Ltd to undertake to S&EIR process. This report constitutes the Final EIA Report and is the final phase in the environmental assessment process before a decision is issued. The purpose of the Final EIA Report is to supply the Competent Authority, namely the Department of Mineral Resources (DMR), with the key environmental and social issues identified during the Scoping and Draft EIA Report Phases, findings of the specialist studies undertaking during the process including recommendations made, details the public participation process and issues raised by Interested and Affected Parties (I&APs), assessment of significant issues and applicable mitigatory and management actions proposed to deal with such impacts for all alternatives and finally the recommendation of the EAP on the overall application.

PROJECT DESCRIPTION

- Mineral: Coal;
- Mining Method: Underground board-&-pillar;
- Depth of mining: Average depth between 40 m – 146 m below surface;
- Air vents: Two ventilation shafts required;
- Life of Mine: >10years;
- Product Market: International and/or Sudor Coal & Eskom;
- Locality: 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.

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:
    i. (a) abstraction from a borehole
    ii. (c) and (i) mining activities within 500m from a wetland

iii. (g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams; and

iv. (j) dewatering of underground workings.

PROJECT SCHEDULE TO DATE

DATE	ACTIVITY	Legal timeframe
12 September 2017	Application lodged to DMR	44 days
26 September 2017	Pre-consultation with landowners	
26 September 2017 - 26 October 2017	Providing IAPs (including relevant State Departments) with the opportunity to review and comment on the Draft Scoping **(30 days PPP)**	
27 October 2017	Final Scoping Report submitted to DMR	
01 November 2017	Consultation with the DMR in Witbank to discuss project detail	43 days
02 November 2017	Application acknowledged by DMR	
10 November 2017	Application accepted by the DMR	
02 November 2017	Acknowledgment of the Final Scoping Report by the DMR	
22 November 2017	Pre-application meeting with DWS	
08 December 2017	Final Scoping Report accepted by the DMR	
15 December 2017 – 5 January 2018 (21 days)	Departmental closure for the holidays **(21 days)**	21 days
06 January 2018 – 28 February 2018	Specialist to conduct their specialist environmental studies and assessments	106 days + public holidays
13 February 2018	Site visit with the DMR officials (Ms. Nditsheni Ramuhulu & Mr. Sam Mathavhela)	
05 March 2018	Draft Environmental Impact Assessment Report and EMPr submitted and available for Public Participation Process	
05 March 2018 – 19 April 2018	Providing IAPs (including relevant State Departments) with the opportunity to review and comment on the Draft EIA Report **(31 days PPP)**	

06 April 2018	Request submitted to DMR regarding an extension of 0f 20 days of the relevant prescribed timeframes	
16 April 2018	Granting Letter of the 20 days extension by the DMR	20 days
17 April 2018 –09 May 2018	Providing IAPs with additional time (20 days) to comment on the layout change for Alternative 1	
07 May 2018	Submission of Final EIA Report to the DMR for decision making	

LOCATION

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

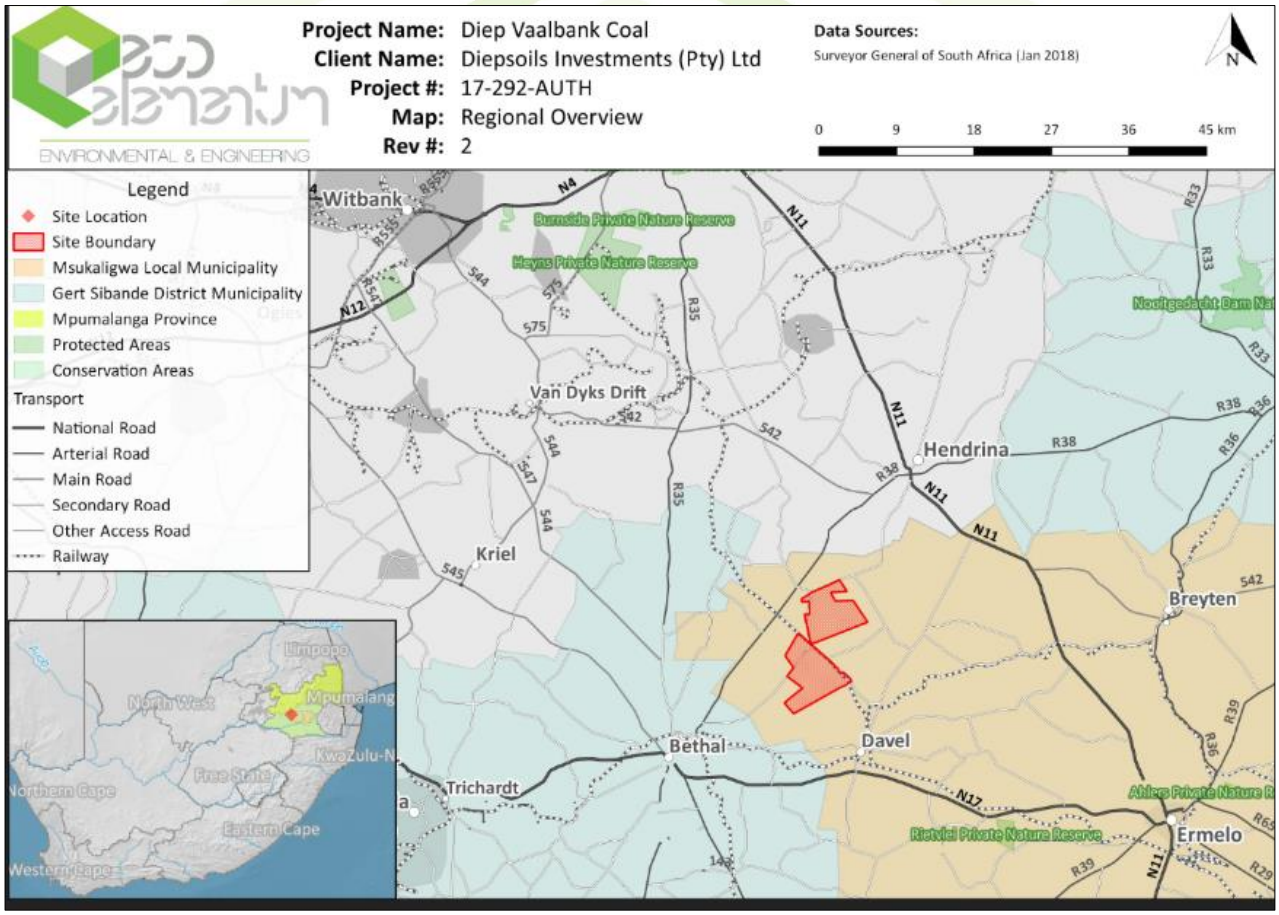

Figure 1: Locality Map

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. 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 and screening). 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

Two alternatives proposed and are the only feasible locations for the mining operation (see below).

Table 1: Two alternatives proposed

Original Alternative 1 (Preferred):	Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 5 of the farm of the Kalabasfontein 232 IS.
New Alternative 1 (Preferred)	Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 5 of the farm of the Kalabasfontein 232 IS **outside the 100m buffer** of the wetland area and with a new proposed access route which has been diverted to the north resulting in a lower environmental footprint
Alternative 2 (Alternative Site):	Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 10 of the Farm Rietkuil 224 IS.

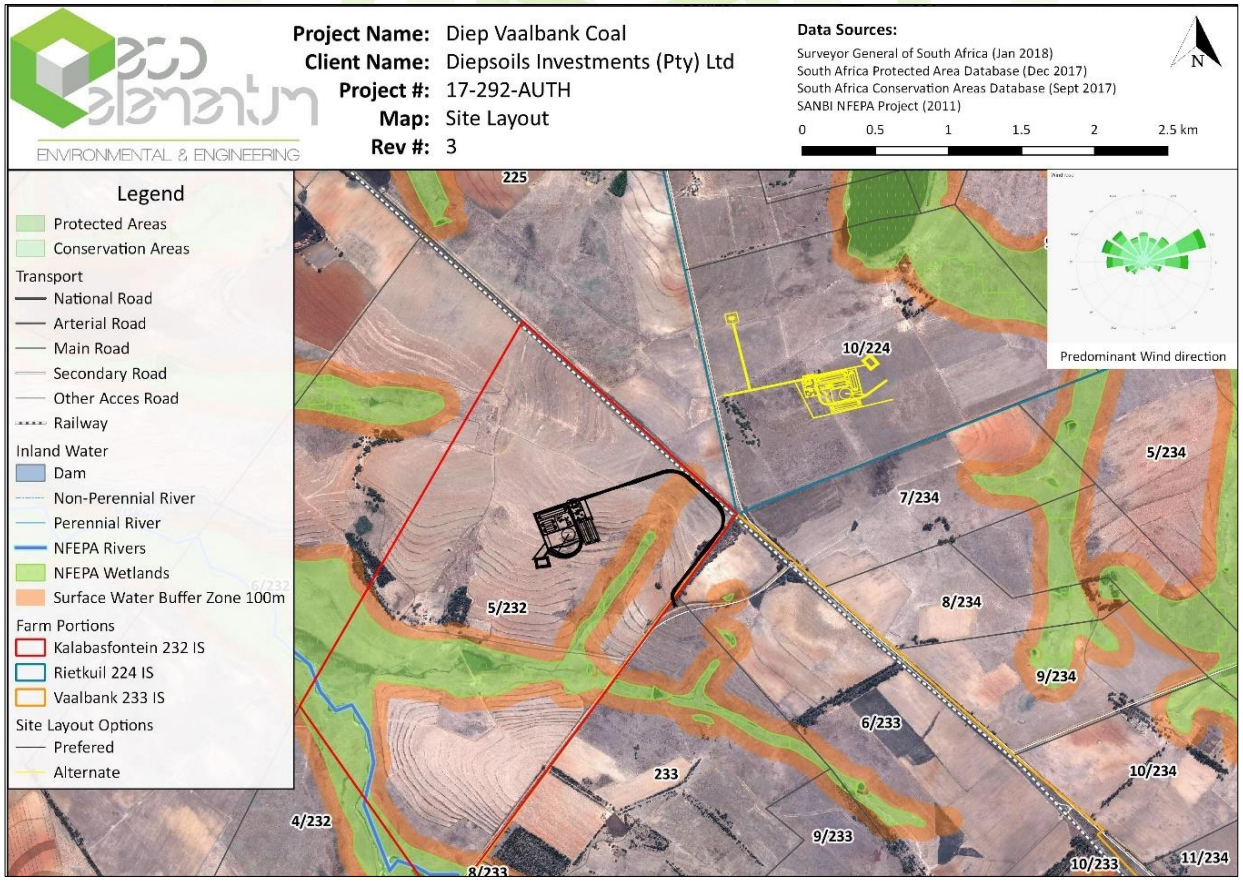

Figure 2: Layout Alternative Map

OUTCOME OF LANDOWNER CONSULTATION

Table 2: Landowner Consultation Summary

PROJECT ALTERNATIVE	RELEVANCE	FARM NAME/NUMBER	LANDOWNER	COMMENT
ALTERNATIVE 1 (Portion 5 of the farm of the Kalabasfontein 232 IS.)	Landowner	Portion 5 Of The Farm Kalabasfontein 232 Is	Mr. Fred Kadish Fremax Farms	Owner not opposed to project, lease agreement to be in place prior to mining activities
ALTERNATIVE 2 (Portion 10 of the Farm Rietkuil 224 IS)	Landowner	Portion 10 Of The Farm Rietkuil 224 Is	Mr Ludolf Uys	Opposed to mining project on this property
ALTERNATIVE 2 (RIETKUIL BENEFICIARY GROUP)	Adjacent Landowners	Various Portions	Various Members	Opposed to mining project on the Rietkuil Portions
ALTERNATIVE 1 AND 2	Landowners/Adjacent Landowner to Main Mining Infrastructure – Existing Provincial Road Transects His Property	Portion 11 Of The Farm Rietkuil.	Mr. Michael C. Erasmus	Noise and dust pollution from the main access road (R38) which traverses his property

SUMMARY OF PUBLIC PARTICIPATION PROCESS

DATE	PUBLIC PARTICIPATION PROCESS	PHASE
19 September 2017	Placing of site notices at conspicuous places around the site including the Bethal and Hendrina libraries.	SCOPING PHASE
27 September 2017	1st consultation with landowners	
27 September 2017	Draft Scoping Report Announcement to all I&AP's with BID	
22 September 2017 29 September 2017	Newspaper Adverts placed (Ridge Times and the Middelburg Observer)	
26 September 2017 - 26 October 2017	Providing IAPs (including relevant State Departments) with the opportunity to review and comment on the Draft Scoping **(30 days PPP)**	
04 October 2017	Reminder sent to all I&AP and landowners on the proposed project and opportunity to review and comment on the Draft Scoping **(30 days) – with the PP Open-day/meeting scheduled for 06 October 2017**	
06 October 2017	1st Public Open Day at the Bethal Public Library during the Scoping Phase	

23 October 2017	2nd Landowner Consultation	
27 October 2017	Final Scoping Report submitted to DMR	
22 November 2017	Pre-application meeting with DWS	EIA PHASE
13 November 2017	The sending of Background Information Documents to affected parties via registered post, email, hand delivery, email and courier to land owners, adjacent landowners, relevant State Departments and other identified parties deemed relevant to the application. Relevant State Departments include: DMR, DWS, Gert Sibande District Municipality, Msukaligwa Local Municipality, Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA), Department of Agriculture, Forestry and Fisheries (DAFF), Mpumalanga Tourism and Park Agency (MTPA), Transnet, Eskom, DEA, Transnet etc	
05 December 2017	3rd Further consultation with landowners	
03 February 2018	Invitation to comment sent to all I &AP's on the Draft EIA Report	
02 March 2018	E-mail invitation to comment sent to all I &AP's on the Draft EIA Report	
05 March 2018 – 19 April 2018	Providing IAPs (including relevant State Departments) with the opportunity to review and comment on the Draft EIA Report **(31 days PPP)**	
10 April 2018	2nd Public Open Day at the Bethal Public Library at the Bethal Public Library during the EIA Phase	
17 April 2018 –09 May 2018	Providing IAPs with additional time (20 days) to comment on the layout change for Alternative 1	
Further Consultation with I&APs	An independent Social Specialist was appointed to undertake more in-depth consultation with affected parties during the EIA process. Mr Jessica de Beer from Gibb Engineering undertook the study. The results of her study have been integrated into this Final EIA Report. The full report can be accessed in Annexure 6.	

SUMMARY OF ISSUES RAISED BY I&APS

Issues of specific concern to the precinct users, residents and municipality are as follows:

- That the project initiator brings in or uses its own resources or supply of labour to complete the construction and/or operational aspects of the project;
- That the project initiator reneges on its social and contractual obligations it has made regarding LED and B-BBEE.
- During construction there will be **excessive noise and dust**. This is also a specific issue raised by the landowner (Mr Michael C. Erasmus) of Portion 11 of the Farm Rietkuil namely. The existing main road transects his property and traffic will therefore be increased causing noise and dust

- **Loss of income** due to dust pollution and the effects thereof on Mr Michael C. Erasmus active sheep farming business (Alternative 1 and 2 will impact on Portion 11 due to the location of the existing main road)
- A potentially unsightly mining operation will be replacing a more pleasing agricultural operation **(visual and sense of place)**
- Access to the site and adjacent areas may be impeded or prohibited during the construction phase of the project **(Traffic)**
- Due to operating efficiency and security reason, certain sections of the precinct may be restricted from access during the operational phase of the project. (Traffic)
- Loss of arable land (raised by the landowner, Mr Ludolf Uys, Portion 10 of the Farm Rietkuil 224 IS. (Alternative 2) and income **(change in land use and loss arable land)**

SENSITIVE ENVIRONMENTAL FEATURES

Sensitive Environmental Features	Details
Wetlands and Surface Water	Regionally, both alternatives for the project falls within NFEPA wetland areas (namely class C and DEF). The wetlands on site, were identified as a **Channeled VP** and a **floodplain wetland** Which are associated with the Viskuile Spruit, Bank Spruit; Diepsloot; and Upper Olifants River. A 100 m buffer from these surface water features have been implemented The proposed access for Alternative 1 will however need to cross a Hillslope Seep (within an already disturbed footprint of the Kalabasfontein property on the north). This access has the least impact of the other access routes proposed for Alternative 1
Groundwater Quality	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. 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 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.
Ecological	Regionally, sensitive ecological habitats are associated with the riparian area of the wetland for both alternatives. Both Alternatives were however found to be ***moderately to heavily modified*** A 100m buffer is therefore proposed around wetland features

IMPACT ASSESSMENT SUMMARY

Both Alternatives have associated negative and positive impacts. The outcome of the risk assessment is as follows (only where impact ratings differ between Alternatives)

Alternative Impact Summary Table

ALTERNATIVE	IMPACT ADVANTAGES	IMPACT DISADVANTAGES
Site/Layout Alternatives		
Alternative 1 (**Preferred Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 5 of the Farm Kalabasfontein 232 IS	• Less sensitive heritage features • Landowner agreement is in place • More site disturbance present (including existing access crossings of the Hillslope Seep) • The site has a **lower NFEPA** wetland class rating (DEF-Heavily to Critically modified)	• There are 4 houses on the property that houses people from the local community (Zikalala Household) which would have to be relocated • Higher noise and vibration impacts identified • Crossing of a Hillslope Seep in order to gain access
Alternative 2 **(Alternative Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 10 of the Farm Rietkuil 224 IS	• Less noise and vibration impacts identified	• Landowner opposed to project • Higher Impact on sensitive heritage features (including graves) • More significant loss of arable land and income for landowner due to existing contracts (7year validity) • The site has a **higher NFEPA** wetland rating (C-Moderately Modified)

CONCLUSION AND RECOMMENDATIONS

From the assessment undertaken by the EAP and the outcome of the Public Participation process it is evident that the Diep Vaalbank Coal project will have positive and negative impacts on a social, economic and environmental level. The comparison of the two Alternatives show more or less similar impacts. However, the fact that the landowner of Alternative 2 (Portion 10 of the Farm Rietkuil 224 IS) is opposed to mining infrastructure on his property could render the project unfeasible for the application in the end. The owner of Alternative 1 (Preferred site - Portion 5 of the Farm Kalabasfontein 232 IS) has however agreed to enter into a lease agreement with the applicant. The impacts identified throughout this process can be mitigated to an acceptable level and there are no fatal flaws identified on any of the sites. It is also important to note that Alternative 1 has been more subjected to previous anthropogenic impacts (mostly associated with farming practices) and therefore the site is not in a pristine condition.

The cumulative impacts of mining such as water pollution, dust pollution, loss of arable land, increase in traffic loads on local road networks and the loss of “sense of place” is however relevant on a local and regional scale. The positive socio-economic impacts related to the project (including 120 direct jobs created, contribution to the GDP and the meeting of international and national coal demands) carries a lot weight in a country where unemployment and a struggling economy is a national concern. The project is in line

with national governmental strategies and is not conflicting with Provincial and Local Plans (Spatial Development Frameworks and Integrated Development Plans of Gert Sibande District Municipality and Steve Tshwete Local Municipality). The management of impacts and the undertaking of monitoring requirements must be implemented throughout the LOM and regularly audited as per the Environmental Management Plan. The applicant must provide a Financial Guarantee to successfully decommission and return the site to an acceptable landform once mining activities has ceased.

It is hereby recommended by the EAP that the applicant is granted a positive decision for Alternative 1 and that Environmental Authorisation contains conditions as outlined below:

- A 100m buffer zone must be maintained throughout the LOM and where it cannot be avoided (access road across a Hillslope seep), a Water Use License must be applied for (specifically for Section 21 c and i water uses).
- The 100m buffer zone must be demarcated and marked as a no-go zone for employees and contractors.
- It is essential that the mining footprint is kept to a minimum to minimize the loss of topsoil and arable land. A Soil Management Plan must be prepared prior to site clearance commencing.
- A valid lease agreement with the landowner of Alternative 1 (Mr Fred Kadish of Fremax Farms) must be in place prior to construction activities commencing.
- A Water Use License for all the identified water uses must be in place prior to construction commencing.
- All recommendations made by the various specialists must be implemented through the LOM.
- The Health and Safety of the mine's employees must be prioritised and awareness training must be on-going. In order to address any potential health impacts, it is advised that the applicant, along with the appointed contractor(s), devise and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. All permanent employees should receive Health and Safety, including basic HIV/AIDS awareness training at the onset of their employment.
- The implementation of the Social Labour Plan (SLP) is key to the local economic benefit of the project. The SLP must be aligned with the Mining Charter.
- Monitoring of surface water quality, groundwater quality and groundwater quantity, aquatic ecological health via biomonitoring, dust levels (specifically PM2.5 and PM10), ecological status via the Biodiversity Action Plan and Soil Management Plan, noise levels and the integrity of mining infrastructure that could cause harm to the receiving environment is essential to the project's long term environmental footprint.
- The recommendations and principles of the Stormwater Management Plan must be adhered to.
- A comments and complaints register, accessible to members of public, should be implemented and maintained by the main contractor prior to construction commencing.
- The mine should strive to apply good housekeeping practices where and when possible, and
- The adherence to other relevant national and provincial pieces of legislation governing any aspect of the mining activity must be assessed throughout the LOM.

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Definition of Terms

Audit	a systematic, independent and documented review of operations and practises to ensure that relevant requirements are met. Qualified professionals with relevant auditing experience should conduct audits and, where possible, independent external auditors should also be used.
Borehole	is a narrow shaft bored in the ground, either vertically or horizontally. A borehole may be constructed for many different purposes, including the extraction of water or other liquid (such as petroleum) or gases (such as natural gas), as part of a geotechnical investigation, environmental site assessment, mineral exploration, temperature measurement, as a pilot hole for installing piers or underground utilities, for geothermal installations, or for underground storage of unwanted substances, e.g. in Carbon capture and storage.
Clean Water	clean water is any water that has maintained the chemical, physical, and biological integrity of the waters by preventing point and nonpoint pollution sources.
Compliant	a full achievement of the performance requirement of a particular condition of the license or programme.
Conservation	in relation to a water resource means the efficient use and saving of water, achieved through measures such as water saving devices, water-efficient processes, water demand management and water rationing;
Construction	the time period that corresponds to any event, process, or activity that occurs during the Construction phase (e.g., building of site, buildings, and processing units) of the proposed project. This phase terminates when the project goes into full operation or use.
Corrective Action Plan	an action plan developed by the proponent, contractor, or facility owner and approved by the external auditor that describes how the contractor or facility owner intends to resolve the non-conforming item. The Corrective Action Plan should be specific, measurable, achievable, realistic, and timely.
Director-General	means the Director-General of the Department;
Effluent	is defined by the United States Environmental Protection Agency as "wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters". The Compact Oxford English Dictionary defines effluent as "liquid waste or sewage discharged into a river or the sea". Effluent in the artificial sense is in general considered to be water pollution.
Environmental Audit Report	a summary report prepared after an environmental audit that describes the attributes of the audit and the audit findings and conclusions.
Environmental Authorisation	is an environmental authorisation issued by a state department.
Environmental Component	an attribute or constituent of the environment (i.e., air quality; marine water; waste management; geology, seismicity, soil, and groundwater; marine ecology; terrestrial ecology, noise, traffic, socio-economic) that may be impacted by the proposed project.
Environmental Impact	a positive or negative condition that occurs to an environmental component as a result of the activity of a project or facility. This impact can be directly or indirectly caused by the project's different phases (i.e., Construction, Operation, and Decommissioning).
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

ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Submitted for Environmental Authorisations 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).

DETAILS OF APPLICANT

Table 3: Applicant Details

Applicant Name:	DIEPSOILS INVESTMENTS (Pty) Ltd
Registration No.:	MP 30/5/1/2/2/10187 MR
Contact Person:	Mr. Nicholus Maloba (CEO
Telephone:	083 476 1247
Fax:	086 696 4891
E-mail:	nicholusmaloba@telkomsa.net
Postal Address:	PO Box 1677, Ferndale, 2160
Physical Address:	Unit 15, Concept House A, 10 Pony Street, Silver lakes, Pretoria

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.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

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

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

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

d. determine the—-

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

   ii. degree to which these impacts—

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

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

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

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

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

PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. INTRODUCTION

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 (EAP) have been appointed by Diepsoils Investments (Pty) Ltd to undertake to S&EIR process. This report constitutes the Final EIA Report and is the final phase in the environmental assessment process before a decision is issued. The purpose of the Final EIA Report is to supply the Competent Authority, namely the Department of Mineral Resources (DMR), with the key environmental and social issues identified during the Scoping and Draft EIA Report Phases, findings of the specialist studies undertaking during the process including recommendations made, details the public participation process and issues raised by Interested and Affected Parties (I&APs), assessment of significant issues and applicable mitigatory and management actions proposed to deal with such impacts for all Alternatives and finally the recommendation of the EAP on the overall application.

1.1 PROJECT DESCRIPTION

- Mineral: Coal;
- Mining Method: Underground board-&-pillar
- Depth of mining: Average depth between 40 m – 146 m below surface;
- Air vents: Two ventilation shafts required;
- Life of Mine: >10 years; and
- Product Market: The coal is earmarked for the export market, and revenue is based on $87/t free on board. Given the size and quality of the reserve, the proposed Colliery will target primarily export markets as a RB1 quality.

The current project for the extraction of coal is forecasted to have a Life of Mine ("LoM") in excess of 10 years, during which 5 million tonnes saleable coal will be extracted from the underground operations during a Phase 1 operation, at an average yield of 45,9%. Expansion opportunities exist to further extend the life of mine but has not been included at this stage.

1.2 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 232 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 and screening). 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.

2. CONTACT DETAILS

2.1 APPLICANT

Table 4: Applicant Details

Applicant Name:	DIEPSOILS INVESTMENTS (Pty) Ltd
Registration No.:	MP 30/5/1/2/2/10187 MR
Contact Person:	Mr. Nicholus Maloba (CEO
Telephone:	083 476 1247
Fax:	086 696 4891
E-mail:	nicholusmaloba@telkomsa.net
Postal Address:	PO Box 1677, Ferndale, 2160
Physical Address:	Unit 15, Concept House A, 10 Pony Street, Silver lakes, Pretoria

2.2 ITEM 3(A)(I): ENVIRONMENTAL ASSESSMENT PRACTITIONER

Table 5: EAP Details

EAP:	Eco Elementum (Pty) Ltd - Environmental and Engineering
Contact Person:	Vernon Siemelink (Author and EAP)) Carene Kruger (External Reviewer)
Telephone:	012 807 0383
Fax:	N/A
E-mail:	vernon@ecoelementum.co.za; carene@ecoelementum.co.za; info@ecoelementum.co.za
Postal Address:	26 Greenwood Crescent, Lynnwood Ridge, 0040
Physical Address:	442 Rodericks Road, Lynnwood, Pretoria 0081

2.3 ITEM 3(A)(II): EXPERTISE OF THE EAP

2.3.1 The Qualifications of the EAP

Table 6: EAP Qualifications

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
Qualifications	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.

2.3.2 Summary of the EAP's Past Experience

Table 7: 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 has also completed the CEM auditor conversion training for ISO 9001, ISO 14001 and OHSAS 18001 Integrated Management Systems.

3. ITEM 3(B): DESCRIPTION OF THE PROPERTY

Table 8: 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:	The project can be accessed via N17 from Johannesburg and R38 from Bethal towards Hendrina
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

3.1 LOCALITY MAP

(Nearest town, scale not smaller than 1:250000 attached as Annexure 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 (**Error! Reference source not found.**). The project can be accessed via N17 from Johannesburg and R38 from Bethal towards Hendrina.

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.

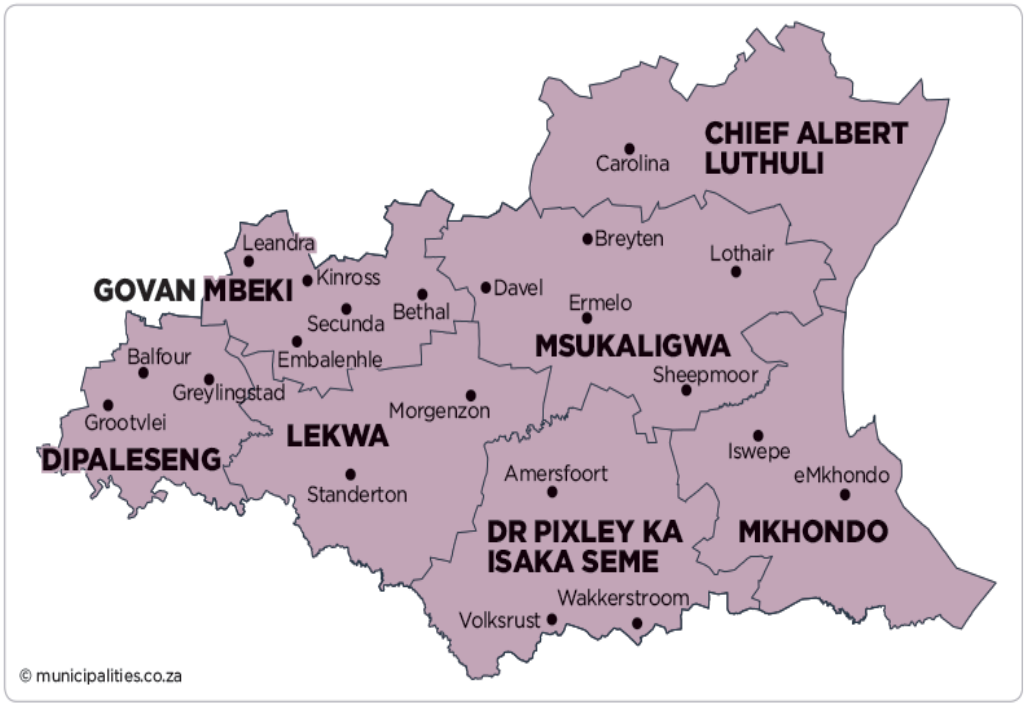

Figure 3: Gert Sibande District Municipality

4. ITEM 3(D) (II): DESCRIPTION OF THE OVERALL ACTIVITY

4.1 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 Annexure 4.

Table 9: Description of the Overall Diep Vaalbank Coal Activity

ITEM	DETAIL
Type of mineral	Coal
Mining method	Conventional Board and Pillar mining by means of drill and blast.
Mineral Processing	Crushing and Screening
Mineral Right Area and overall application area	5,626 ha
Physical Mining Footprint	25 ha
Depth of the mineral below surface	The dominant seams are Seam No.2 with average thickness of 1.00m, Seam No. 4 with an average thickness of 2.03m and Seam No. 5 with an average thickness of 0.80m The coal seams are relatively shallow, less than 150m below surface
Geological formation	Located on the southern edge of the Witbank Coalfield. In the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic levels.
Life of mine	>10 Years.
Production rate	Alternative 1/ Phase 1 (Vaalbank): The ROM coal inventory is predicted at 13.4 million tonnes. Based on the estimated potential ROM tonnages and three mining production section at 25,000 tonnes per month the project has a LOM of 16 years. Alternative 2/Phase 2 (Rietkuil) The ROM coal inventory is indicated at 13.4 million tonnes. Based on the estimated potential ROM tonnages and three mining production section at 25,000 tonnes per month the project has a LOM of 20 years.
Saleable Product	The mine will target primarily export markets as a RB1 quality.
Target Market	International (Export) or National (Eskom)

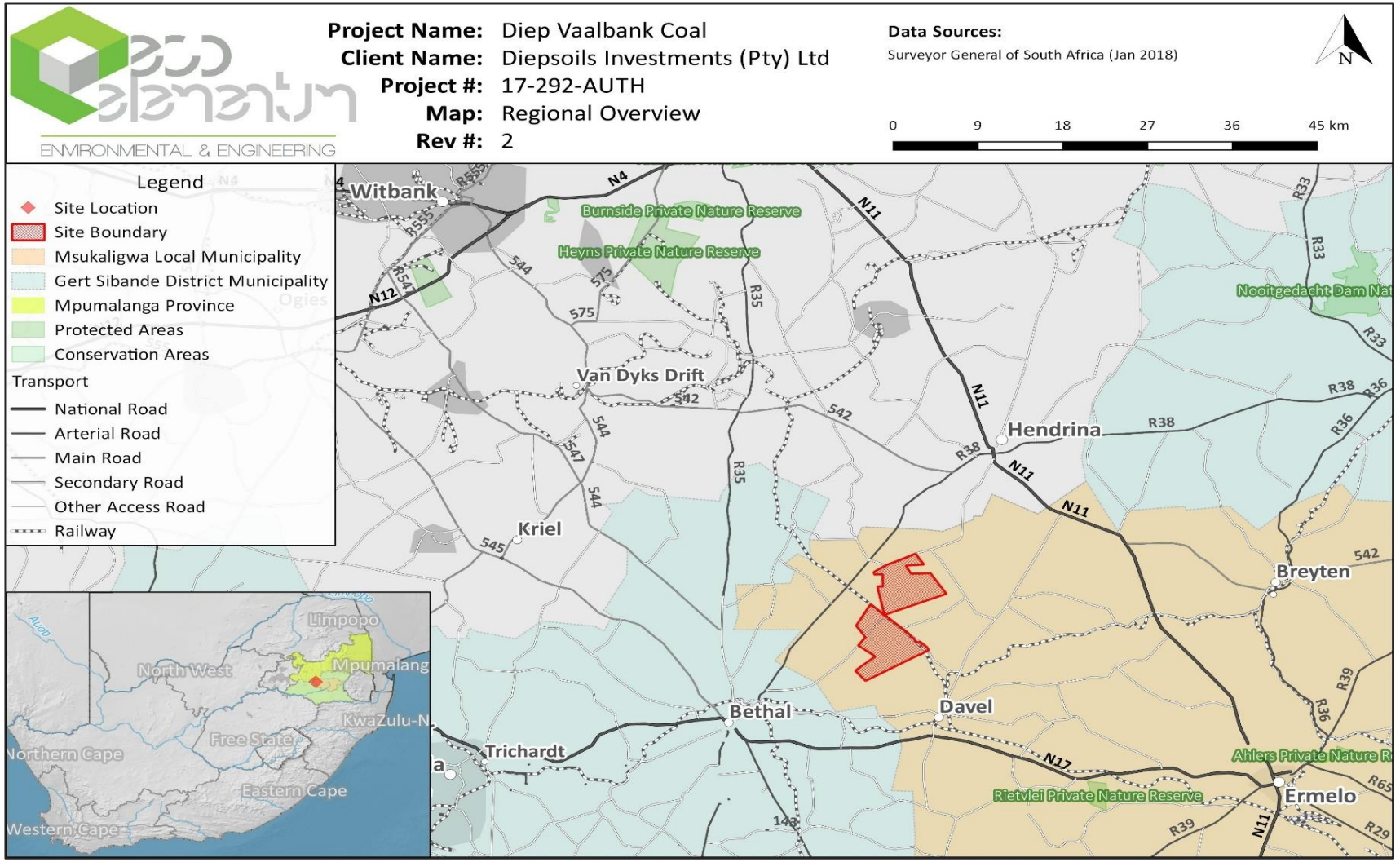

Figure 4: Regional Overview Map

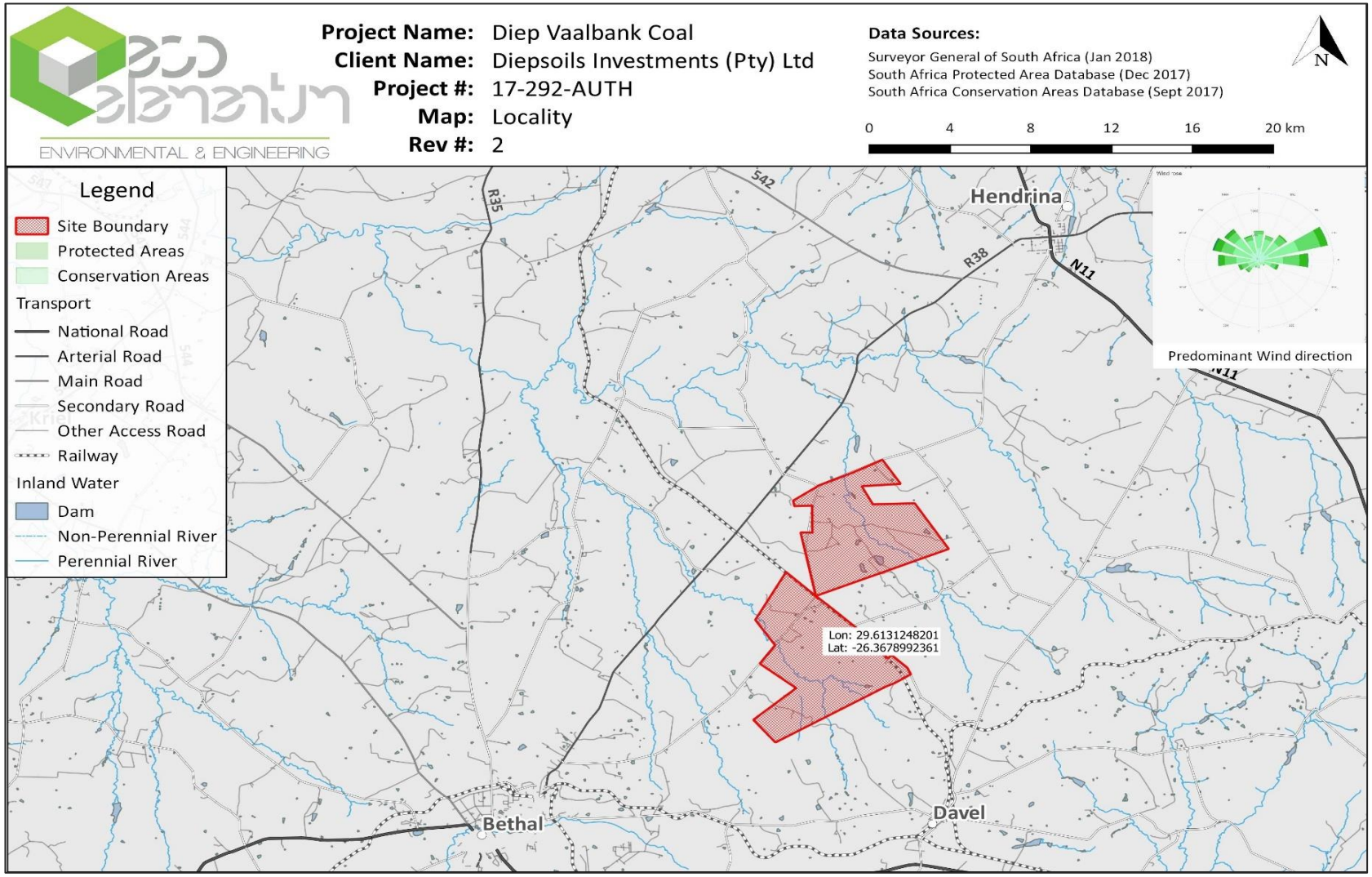

Figure 5: Locality Map

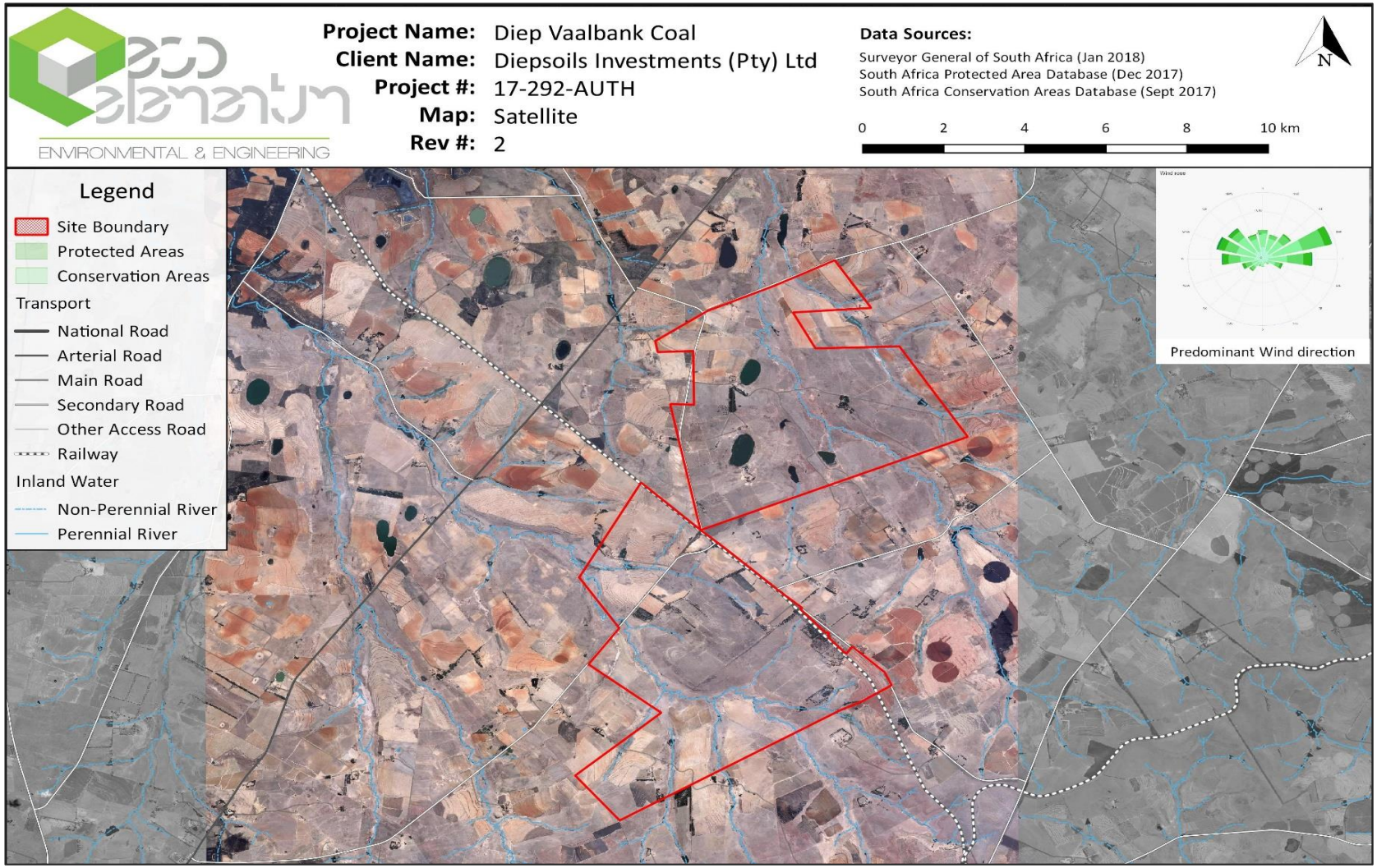

Figure 6: Locality Map with Satellite Imagery

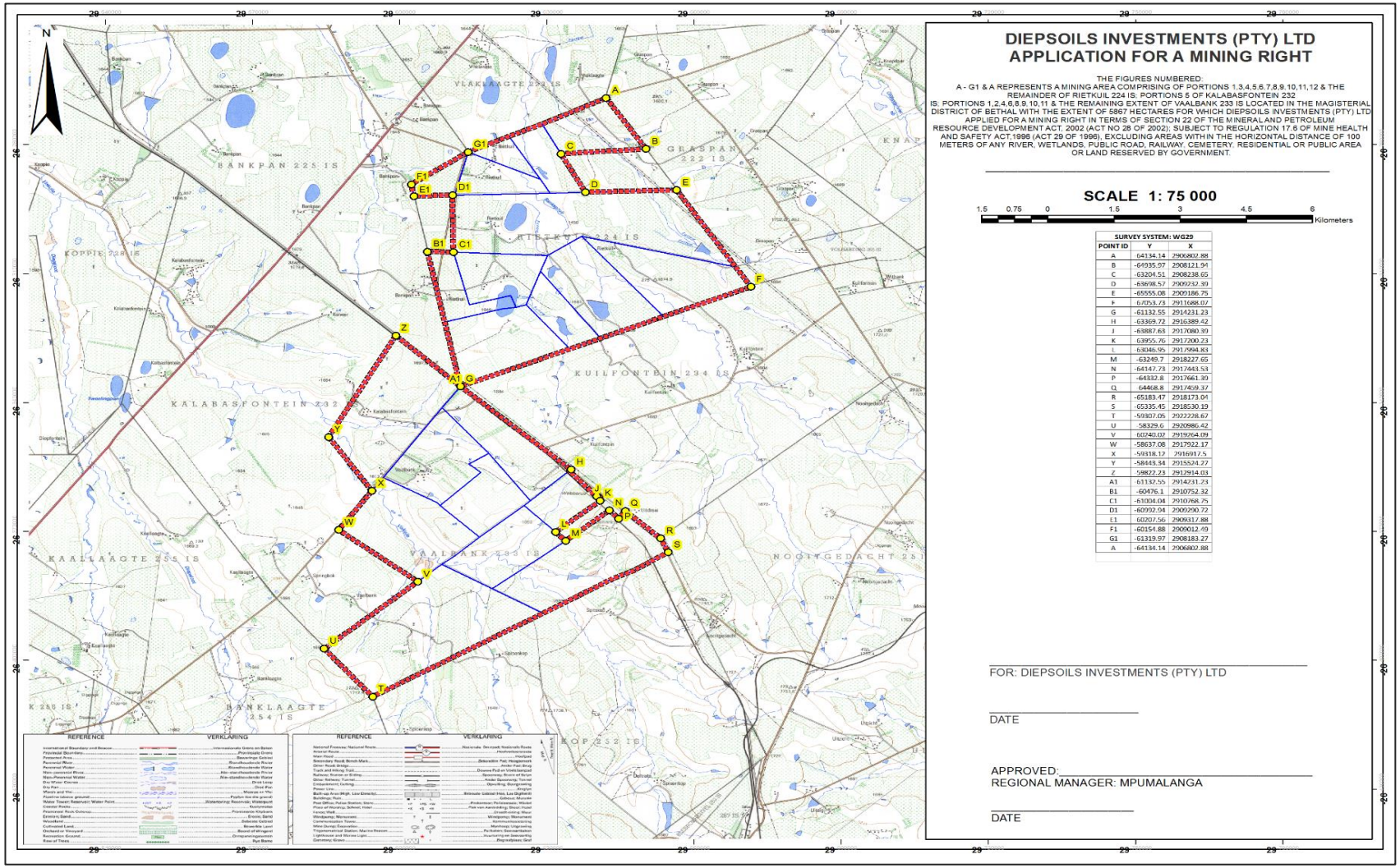

Figure 7: Regulation 2(2) Map

Map 1: Alternative 1 (Preferred) : Site Layout Vaalbank

Map 2: Alternative 2 Site Layout – Rietkuil

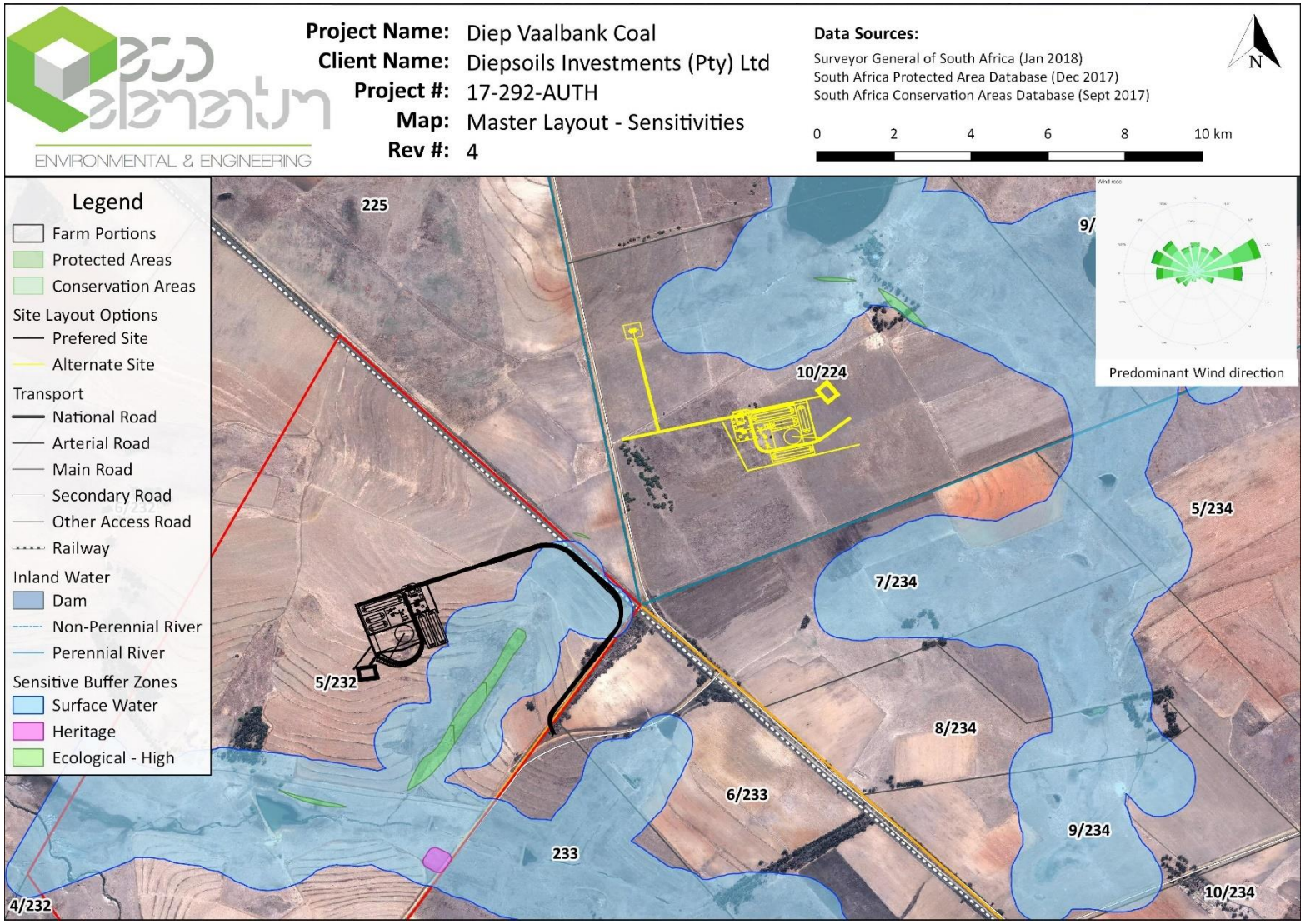

Figure 8: Alternatives 1 and 2 and Overall Sensitivity Map

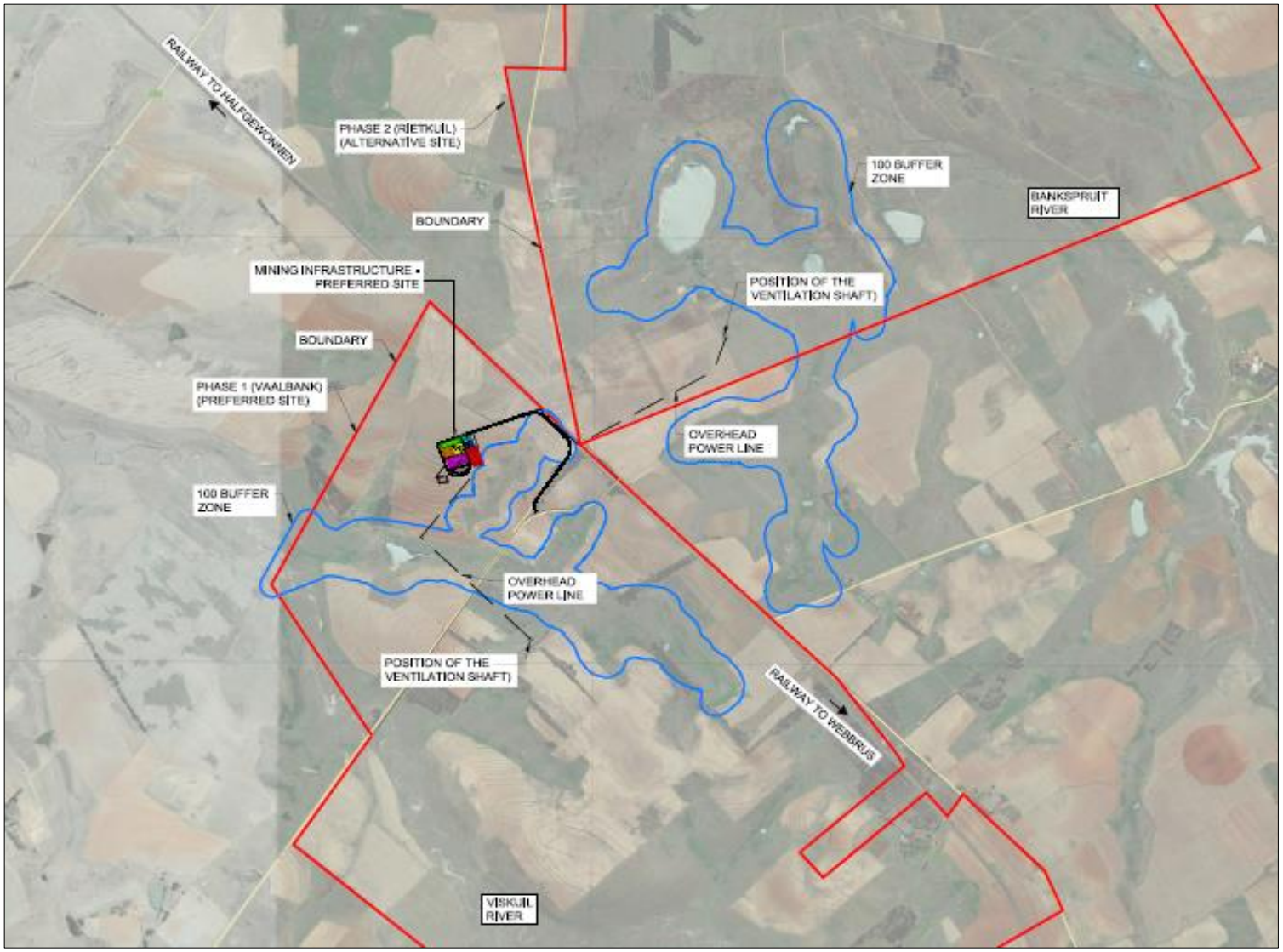

Figure 9: Close up of Alternatives 1 and 2 and associated Wetland Buffer

4.2 Listed Activities To Be Undertaken

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 are listed in Table 10 below.

Table 10: 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
All infrastructure areas, development footprints and associated activities.	Mineral Boundary 5,867 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
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
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		GNR 633 includes the establishment or reclamation of a residue stockpile or residue deposit resulting from prospecting or mining activities as a listed activity.	Category C waste management activities which do not require a waste management license but compliance with relevant norms and standards.
Coal product stockpile and loading area	Product coal: 1.9ha for 15000-20000 tons			Category B: Activity 7, 10
Access and hauling along roads	4500m x 13m	X	GNR 983, listed activity 24 GNR 985, Listed activity 4	
Processing Plant (crushing, screening)	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,
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			Category C waste management activities which do not require a waste management license but compliance with relevant 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 11: 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**	11	The development of— dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or 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 13.5 m or where no reserve exits where the road is wider than 8 m 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 1 km or shorter. ***Project Relevance:*** ***Building of access and haul roads (4.5 km with 1 3m 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 license or an amended permit or license 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 (Act No. 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, 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.

Listing Notice 2	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 5,867ha of the mining boundary area) which include:** • **Topsoil & subsoil stripping & stockpiling into berms.** • **All infrastructure areas, development footprints and associated activities.**
	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, and screening.**

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. **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 is 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 is relevant**

4.3 ITEM 3 (D) (II) DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

4.3.1 Project Overview

- Mineral: Coal
- Mining Method: Underground board-&-pillar
- Depth of mining: Average depth between 40 m – 146 m below surface
- Air vents: Two ventilation shafts required
- Life of Mine: >10 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.

4.3.2 Mineral Reserve

Located on the southern edge of the Witbank Coalfield. In the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic levels.

▪ 5 Seam; ▪ **4A Seam;** ▪ **4 Seam;** ▪ 3 Seam; ▪ **2 Seam;** ▪ 1 Seam

The dominant seams are Seam No.2 with average thickness of 1.00m, Seam No. 4 with an average thickness of 2.03m and Seam No. 5 with an average thickness of 0.80m. The coal seams are relatively shallow, less than 150m below surface

4.3.3 Marketing Strategy

The market strategy and analysis for the mine was conducted by the applicant in consultation with Nurizon Consulting Engineers. The analysis was based on current market projections and on preliminary discussions with various potential clients. Nurizon states that given the size and quality of the reserve, the proposed Coal Mine should target primarily export markets as a RB1 quality. Coal pricing, as a commodity, is driven by supply and demand, with the export prices as at June 2017 was approximately US$77.37/t and at then prevailing exchange rates of R13.17/US$, this translated to R1018/t Free On Board at the Richards Bay Coal Terminal. These are the prices which have been used in that evaluation and are used in the economic Refer to Annexure 6.

4.3.4 Mining Method

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).

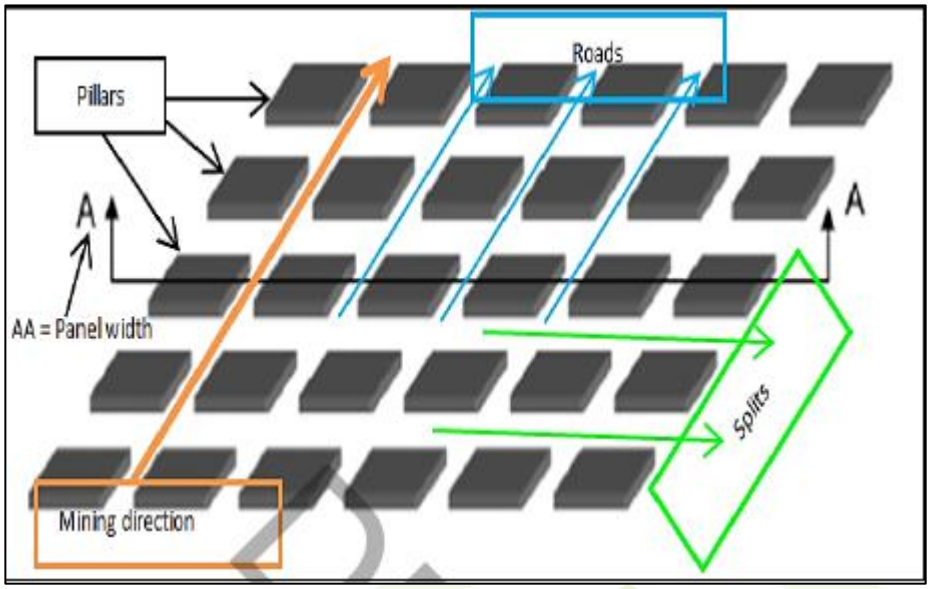

Figure 10: Underground board-&-pillar method Illustration

4.3.5 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.
- Storm water management infrastructure inclusive of pollution control dam.
- Underground water supply pipelines.
- Septic tank for sewage handling/Ablution facilities
- 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).

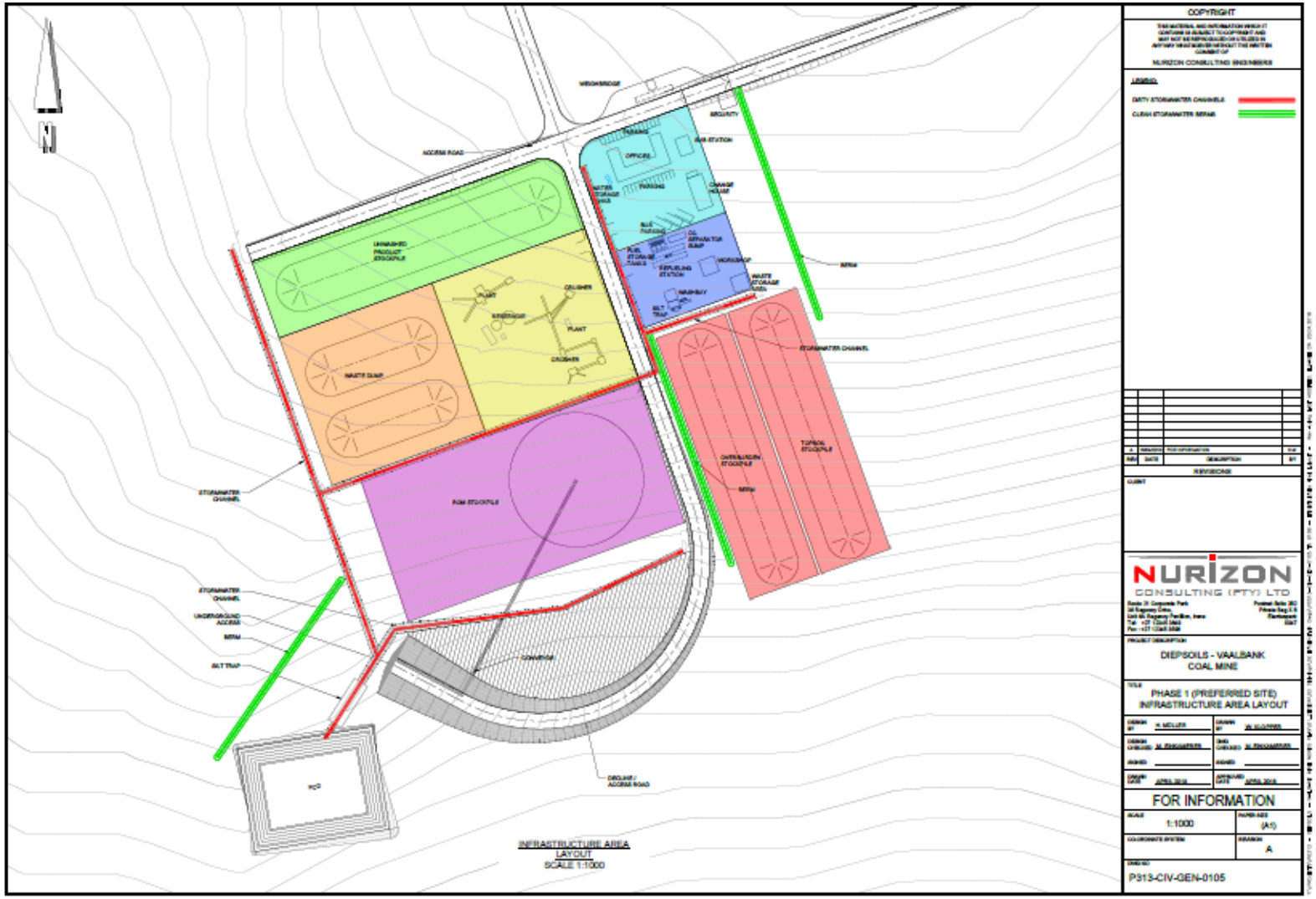

Figure 11: Preferred Alternative 1 Infrastructure Map (Kalabasfontein)

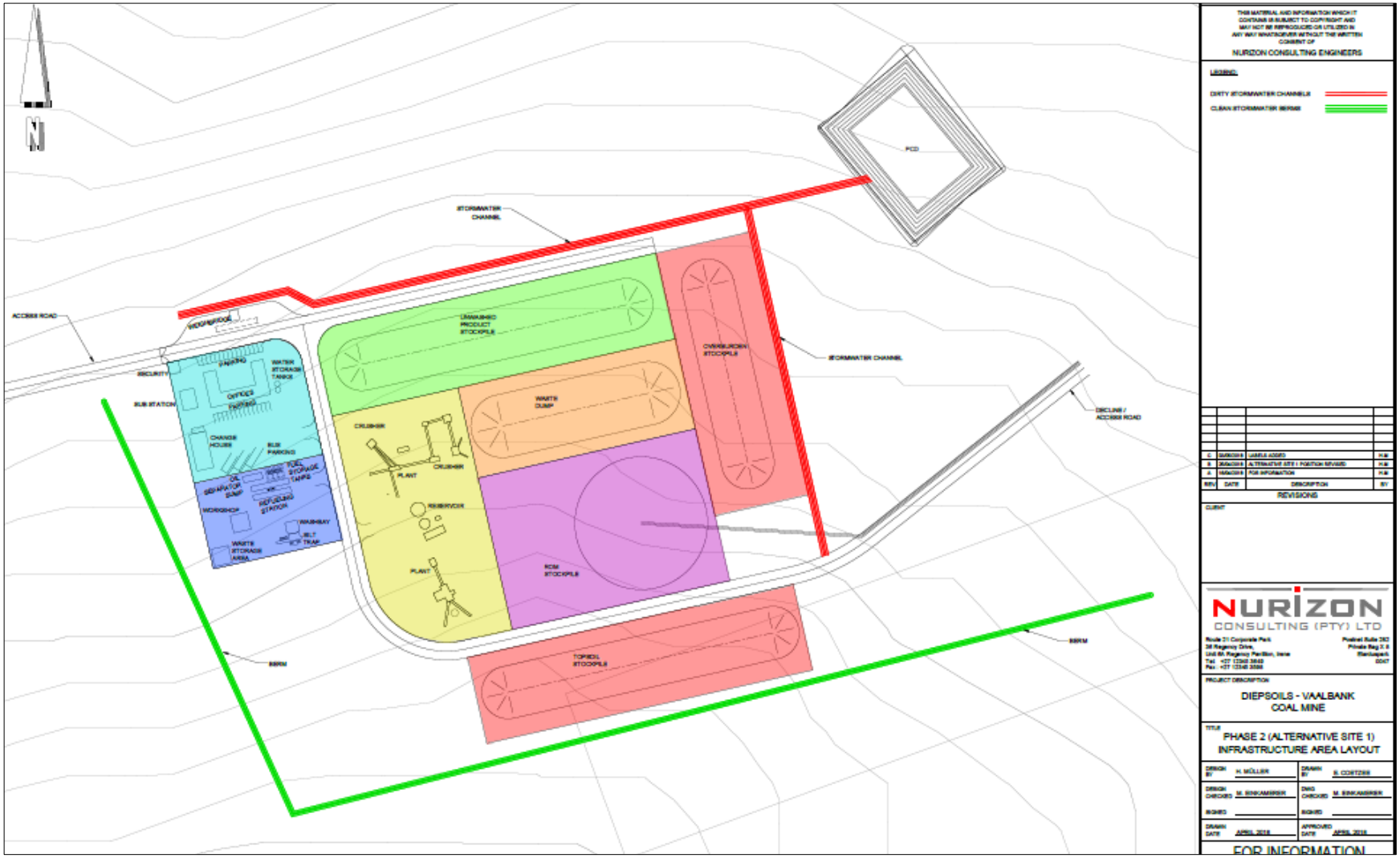

Figure 12: Alternative 2 Infrastructure Map (Rietkuil)

4.3.6 Water Management Infrastructure

The separation of clean and dirty water on site is crucial in reducing the negative impacts of mining activities on the receiving environment. Specific management principles are outlined in the National Water Act, 1998 (Regulation No. GN 77 also called GN 704). All dirty water management facilities must be designed to cater for a 1:50 year storm event, as required by GN704 of NWA.

Reinforced concrete stormwater channels will be constructed. The purpose of these channels is to collect all the stormwater from the infrastructure area and convey it to the Pollution Control Dam (PCD); • The water from the PCD will be re-used (wash water, fire water, dust suppression, etc.); Refer to Figure 17 for the storm water management infrastructure on site

4.3.6.1 Dirty Water Areas of the Mine and Pollution Management Infrastructure

Dirty water is defined as stormwater runoff from inside the operational area (or areas) where the water could have encountered a potential source of contamination, e.g. hydrocarbons. Water from such sources should be intercepted and stored in a **pollution** control dam (PCD) to form part of a closed system, whereby the water is recycled as far as feasibly possible for use in mine operational processes. The following areas of the operational have been identified as part of the dirty water catchment area:

- Crusher/beneficiation plant
- Product stockpiles (including Waste Rock)
- Coal loading platform
- Fuel storage area
- Internal haul roads
- Weighbridge
- Groundwater ingress and rainfall intercepted within incline

It has been assumed that groundwater seepage and stormwater ingress within the incline as well as underground will be pumped directly to the PCD (as required) serving as source of raw water to be used by the coal crusher/beneficiation plant.

4.3.6.2 Pollution Control Dam

The stormwater run-off for the infrastructure area was calculated using the rational method. Based on the information, a PCD volume of 9,779m3 (including 800mm freeboard) is required. The PCD barrier design was carried out in accordance with regulation 36784. The proposed barrier is a class C barrier that is required for the Type 3 material in terms of Regulation 634 and 635.

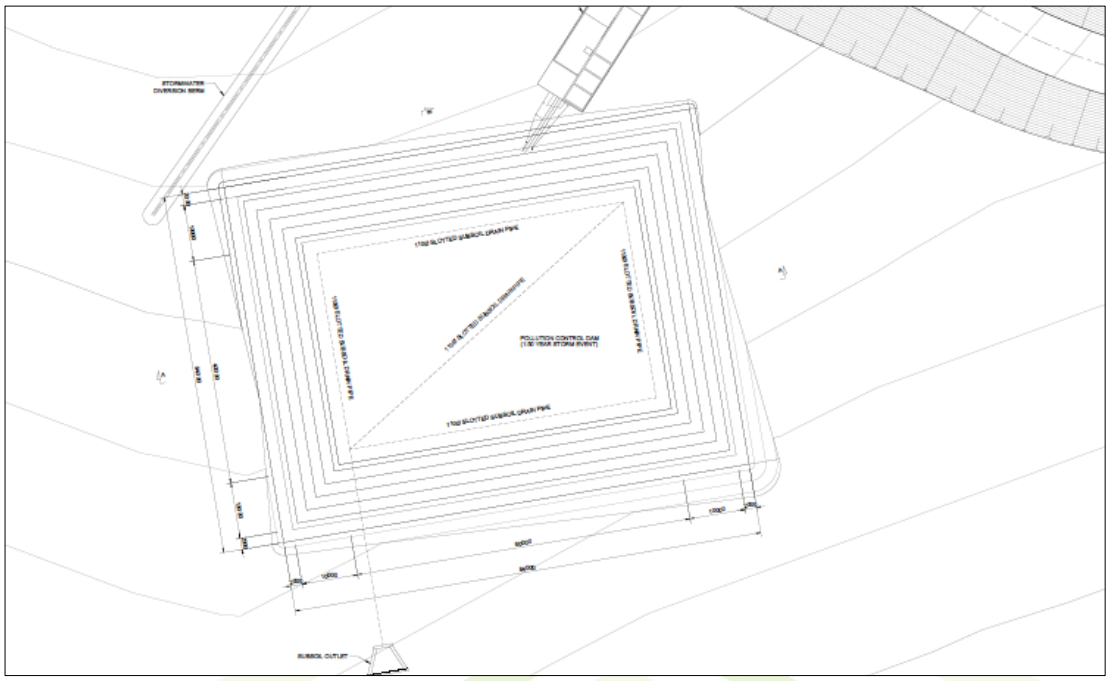

Figure 13: Proposed PCD Layout

The PCD will be lined with a 1.5mm HDPE liner, placed on a geotextile (Bidim A4 or similar) (refer to Figure 9-3). The HDPE liner will have a maintenance free life of 5 years. After this period routine inspections and maintenance will need to be undertaken on in order to ensure the performance of the liners

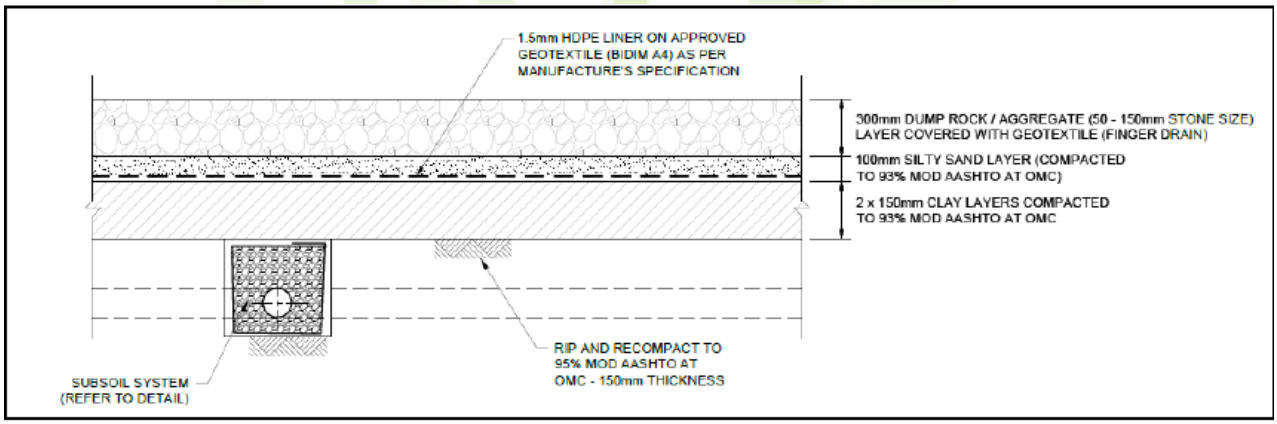

Figure 14: PCD Liner Details

4.3.6.3 Clean Water Areas of the Mine

Clean water is defined as stormwater runoff from areas which fall outside operational areas and are not contaminated by plant process. A mine's clean water management system should wherever possible, be separated from the closed dirty system if it is to be discharged into a natural watercourse.

Stormwater run-off within identified 'clean' catchments will be intercepted by diversion channels and/or earth berms which divert away from the project area, to be discharged into existing watercourses. In an effort to limit the impact of the proposed mining activities on

the existing water resources in the area, clean stormwater runoff from the majority of the area will be diverted towards the Olifants River. The following is planned in this regard:

- Earth (unlined) channels
- Lined channels (for high velocity flows and scour protection)
- Earth berms (alongside platforms in cut)
- Toe drains (along the toe-line of platforms)
- Clean water culverts for road and railway crossings

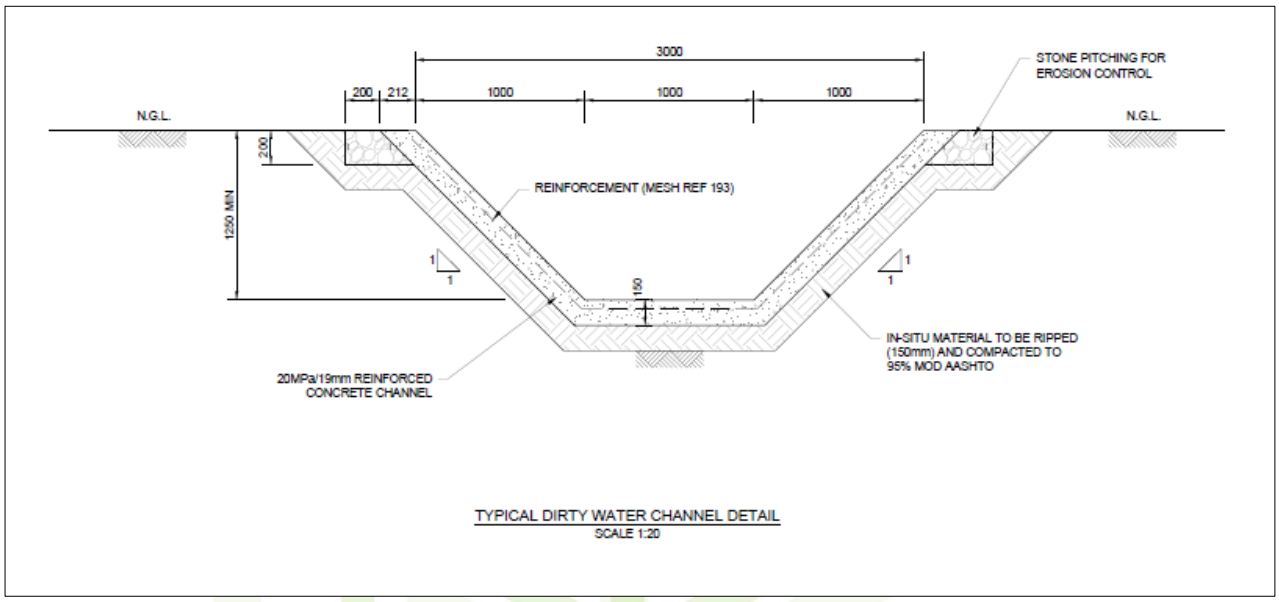

Figure 15: Proposed Dirty Water Channel Cross Section

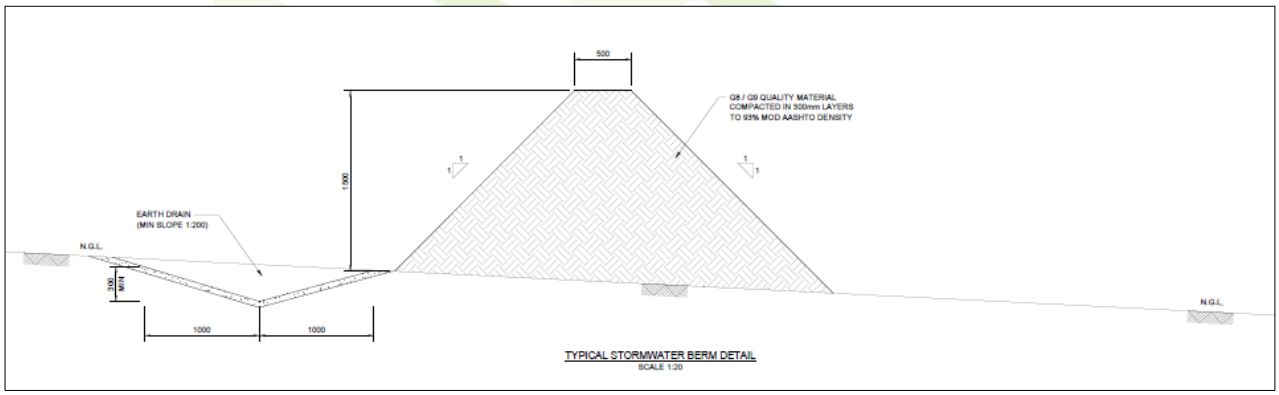

Figure 16: Typical Stormwater Berm Cross Section

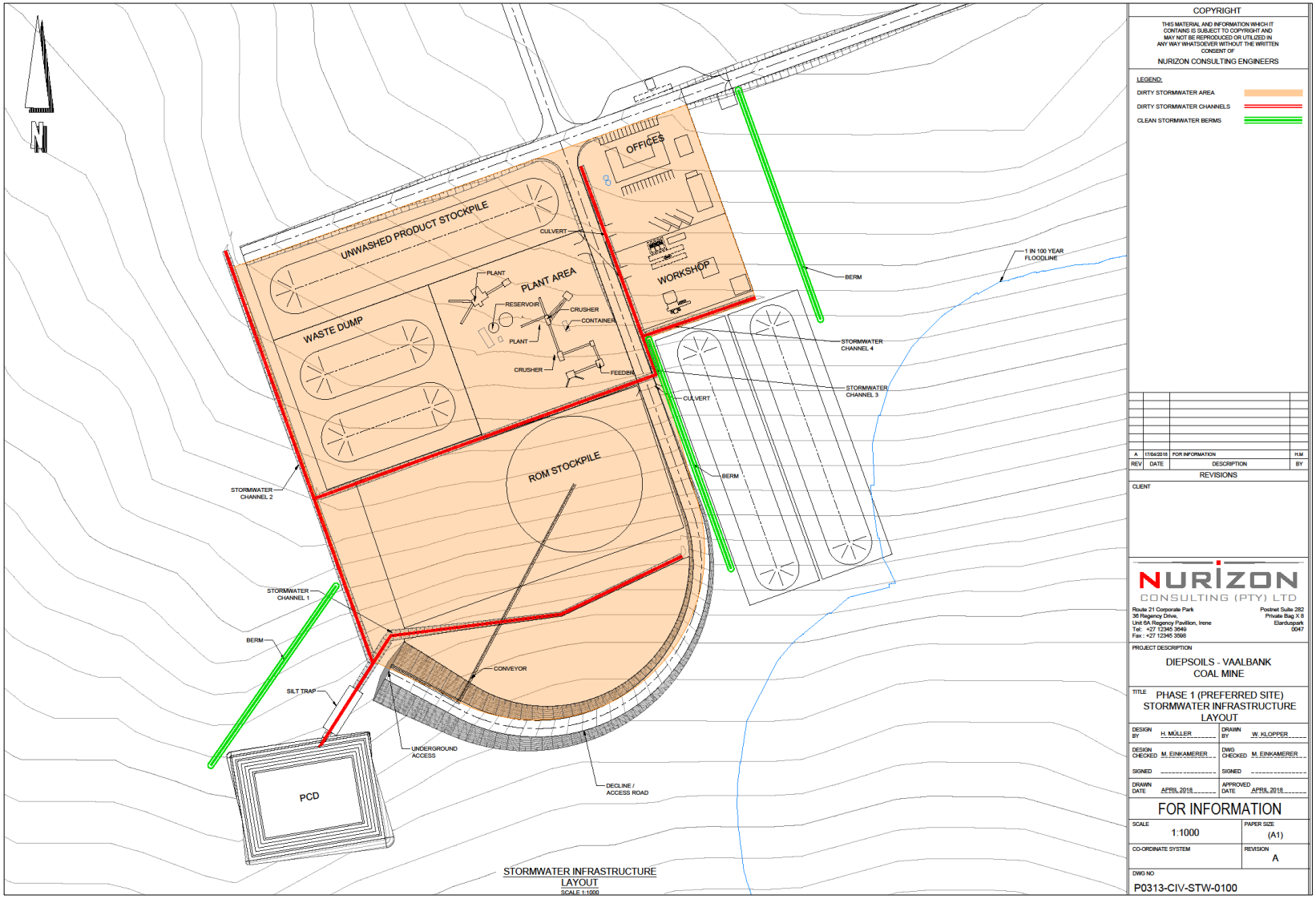

Figure 17: Stormwater Infrastructure

4.3.7 Main Mining Infrastructure

The process of the proposed Diep Vaalbank Coal mining project is provided below.

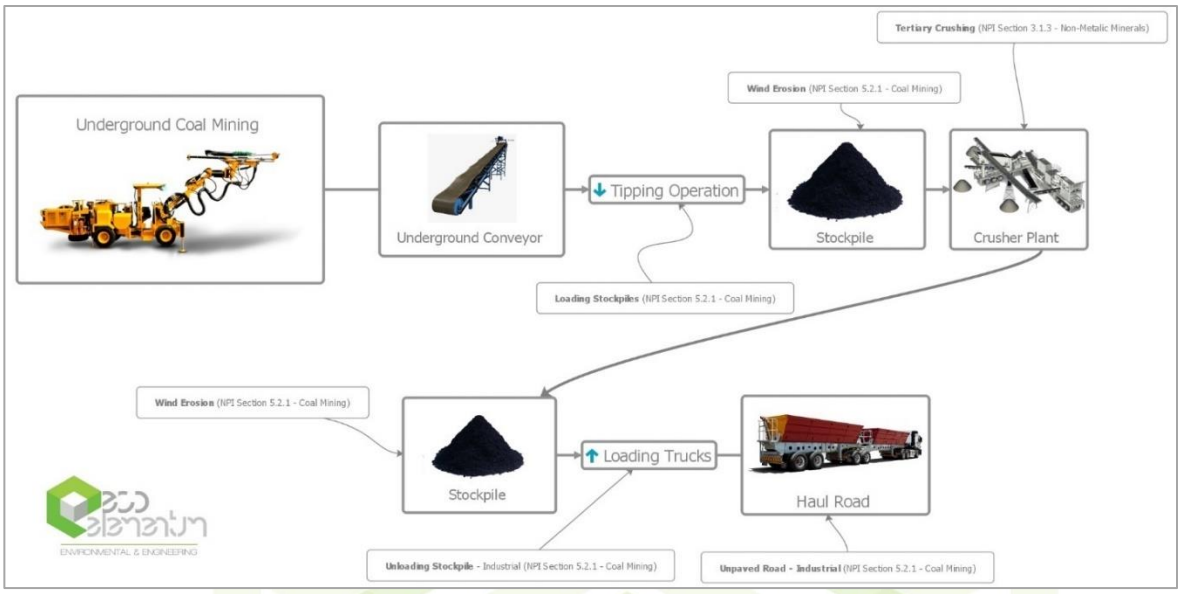

Figure 18: Mining Process Illustration

4.3.7.1 Ventilation Shaft

Ventilation to seam 4 would initially be provided via the decline shaft. Later in the life of the mine, both up and down cast ventilation shafts would be required to allow for sufficient air flow and to provide adequate ventilation throughout the mine workings to create a safe working environment. It was found that a total off two ventilation shafts would be adequate

4.3.7.2 . Decline Shaft

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).

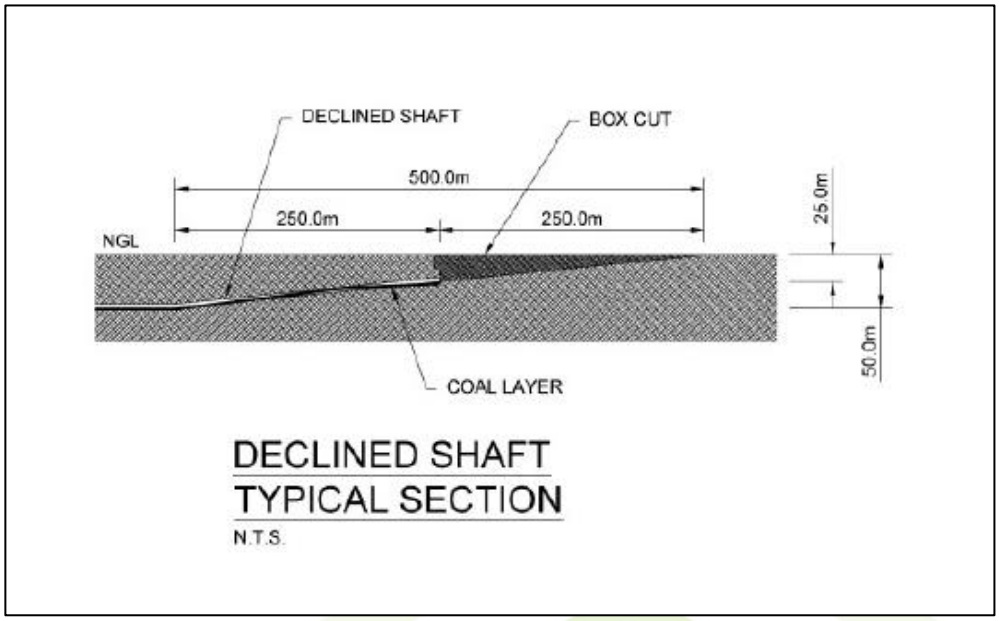

Figure 19: Typical Declined Shaft Section

4.3.7.3 Coal and Rock Handling

The coal will be conveyed from the underground works to surface via a flame-retardant conveyor. The main conveyor width is 1 500 mm with the section conveyor 1 200 mm wide. From the coal face, the coal is transported to the conveyor tail end via shuttle cars and dumped into a feeder breaker. The coal is broken down from 150 mm to 75 mm before transportation to surface.

4.3.7.4 Crushing and Screening

The blasted coal will be loaded and hauled to the ROM coal stockpile, from where the coal will be initially sent to the crushing and screening plant before being hauled via road to the markets

4.3.7.5 Mine Residue Disposal

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.

4.3.7.6 Stockpiles

Any overburden material extracted will be stockpiled and used to rehabilitate the incline shafts once mining is completed.

4.3.7.7 Personnel Transport

Production teams are transported underground to the designated waiting places in non-flameproof underground busses and shift supervisors and maintenance crews use non-flameproof double cab light duty vehicles ("LDV") for inspection, repairs and maintenance.

No personnel transport vehicle will be permitted to travel closer than 180m from the working face. Only approved roadways, equipped with continuous environmental atmospheric electronic surveillances, may be used by these vehicles.

4.3.8 Auxiliary Mining Infrastructure

4.3.8.1 Offices, Workshops and Wash bays

The mine area will be fenced off and access to site controlled. Supporting infrastructure will include:

- Security and access control (permanent security house and boom gates will be constructed at the Mine entrance. The structures will comprise of brick and mortar and will be supplied with electricity from a diesel driven generator.)
- Weighbridge (An area adjacent to the security has been identified for the weighbridge and will require limited cut and fill prior to installation. An accredited weighbridge will be installed by contractors.
- Offices (The contractor will provide 3 mobile offices of 4 x 10m)
- Ablution Facilities - An area has been identified between the security and contractors camp area for ablution facilities.
- Laboratory, clinic and training facilities
- Lamp room, change house and ablution facilities
- Stores and Material
- Workshops, wash bay, and contractors yard
- Bunded fuel storage facility and re-fuelling station; and
- Temporary storage waste yard (general, scrap and hazardous waste).
- Parking and truck wait area
- Underground water supply pipelines;
- 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;

4.3.8.2 Water Supply

Potable water will be supplied from a borehole located near to the contractor's yard. Water for dust suppression will be sourced from the water containment dam.

4.3.8.3 Power Supply

Eskom power will be utilised with a dedicated off take point on existing Eskom infrastructure

4.3.8.4 Access Roads

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. The number of trucks that will be added to the existing road network will peak in year 4. This will be approximately 28 trucks per night and day shift respectively, translating to one interlink every 26 minutes.

The mine access road was designed as a 9m wide gravel road with a design speed of 60km/h. All the horizontal curves are larger than the required 110m with super elevation introduced on the curves. The K-values for the vertical alignment are all larger than the required 16 for crest and sag curves with a minimum curve length of 100m used. The road follows the existing farm roads to the north next to the Trasnet railroad reserve *(which runs between Halfgewonnen – west and Webruss towards the south east)* and farm road on the south eastern side. The route was chosen to reduce the footprint as far as possible within the 1 in 100 flood line area. The tie-in with the existing gravel road is shown in Figure 20. The traffic will then follow the existing gravel road towards the north where it will access the R38.

The intersection with the existing gravel road is located on the outside of the existing horizontal curve which allows for the required sight distances. The intersection has bell mouths with a radius of 12m that will allow for the design vehicles turning movements. The levels of the access road were designed in such a way that the intersection does not require and adjustment to the existing gravel road's alignment or levels.

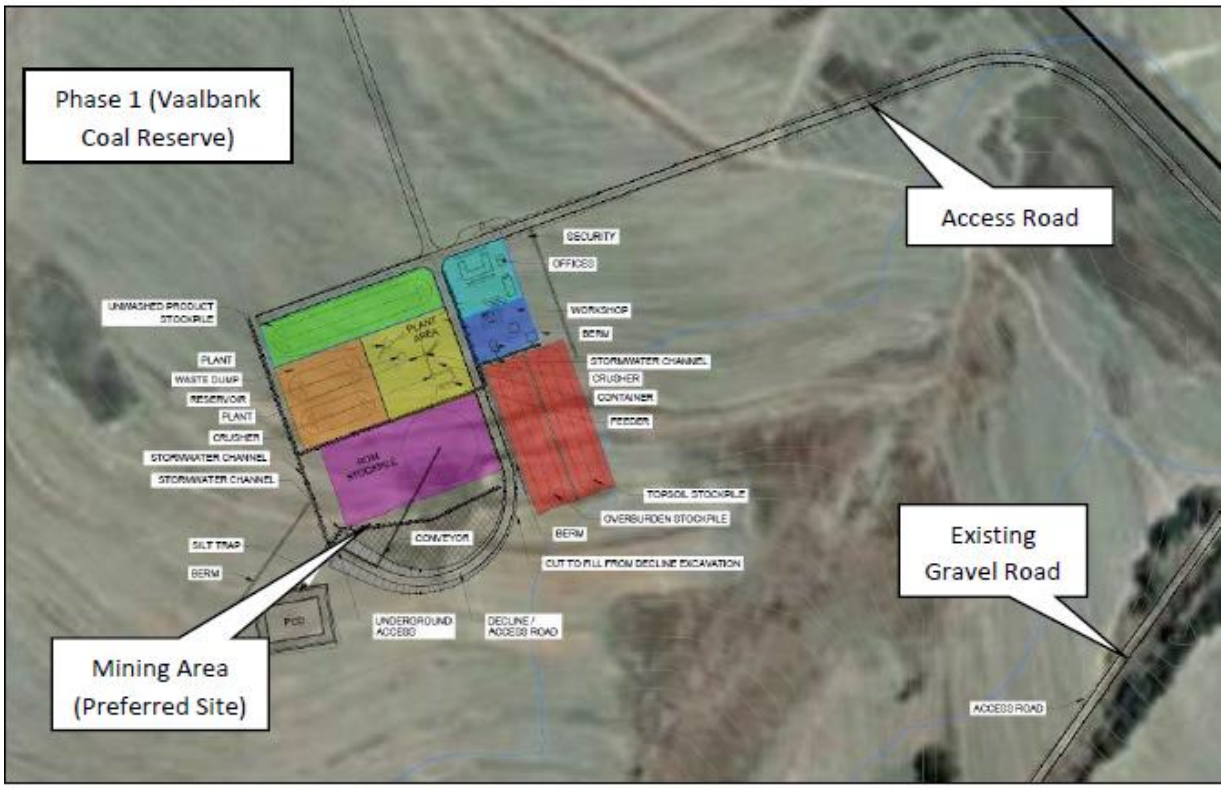

Figure 20: Proposed Access Road

4.3.8.5 Transport of Final Product

Coal will be trucked to market. Sixty (60) tonne payload trucks are envisaged to deal with the total coal hauling capability

4.3.8.6 Waste Management

General and hazardous waste will be generated on site:

- General waste includes office and domestic waste; construction and building waste; scrap metal; old tyres and conveyor belts; and wood.
- Hazardous waste includes mine residue; used hydrocarbons; contaminated construction, building waste and sewerage (septic tanks and package treatment plant

All waste will be separated and stored as per the relevant Norms and Standards where and when relevant. Mine residue will be disposed of at the integrated discard dump and will be managed according to GNR632 (2015) of NEM: WA regarding planning and management of residue stockpiles and deposits.

4.3.8.7 Diesel Storage

Hydrocarbon storage (max.80 m^3) will be constructed at the workshop area, within a concrete bund. The bunded area will be able to accommodate at least 110% of the stored volume.

4.3.9 Employment Requirements

Preference will be given to local employment structures and suppliers if the mine is approved. It has been calculated that one hundred and twenty (120) employees will be employed during the LOM

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5. POLICY AND LEGISLATIVE CONTEXT

Table 12 outlines the legislation and guidelines that are considered to be applicable to the proposed project; and which were considered at the time of compiling this report.

Table 12: Applicable legislation and guidelines

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. 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.	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. 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. GN 704- Regulations on use of water for mining and related activities aimed at the protection of water resource.	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 500 m from a wetland. (g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams; and (j) dewatering of underground workings.	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

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 license 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).	A 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.
Mining Charter Section 100 of the Mineral and Petroleum Resources Development Act (MPRDA) tasks the Minister to establish, assess and where necessary, revise the framework and targets for the entry and ongoing participation of historically disadvantaged South Africans into the sector	The project must align itself with the principles of the Charter	Included in the SLP
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.
Hazardous Substances Act, Act No. 15 of 1973	Hazardous substances handling on site complies with the prescription of the Act and general practices have been included in EMP.	Mitigation and Management measures have been included in the EMP and is continuously monitored.

South African National Standard: SANS 241-1:2011 – Drinking Water Specification: Physical, aesthetic, operational and chemical & microbial determinants including any Resource Water Quality Objectives (RWQOs) set out by DWS	Used to compare quality of water at site.	Water monitoring network has been established and monitoring is to continue as per the approved EMP.
National Road Traffic Act 93 Of 1999 (as amended) To provide for road traffic matters	All traffic matters must be adhered to	Included in the EMP
APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT		
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,	Guidance on the undertaking of Public Participation and the Social Impact Assessment Process	Principles followed during the EIA process and the public participation process.
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.	Used to assess identified impacts	Used to assess identified impacts
PROVINCIAL LEVEL DOCUMENTS/POLICIES		
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 foster economic growth that creates jobs, reduce poverty and inequality in the Province.	Used to identify the provinces plan towards economic growth.	To be assessed and investigated as part of the Need and Desirability of project proposal.

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.
Mpumalanga Conservation Act, Act No. 10 of 1998	According to the Mpumalanga Biodiversity Conservation Plan, conservation status of the proposed site varies from ***heavily modified to CBA Irreplaceable***. However, at the proposed mining site, the conservation status varies from **Moderately Modified (Old lands) to Heavily Modified**	Ecological principles and biodiversity management measures have been included in the EMP as guided by the ecological studies

Greenhouse Gas Emissions Regulations (GG 40762,3 April 2017)	Coal mining and handling falls under Category 1B1a. The mine is therefore required to register on NAEIS and report on their greenhouse gas emissions annually.	Monitoring and reporting to continue as required by the Regulations
Gert Sibande District Municipality: Air Quality Management By-Laws (PG 2300, May 2014)	Measures to prevent and mitigate air pollution have been included within the EMP.	As part of the EMP dust suppression is employed at the mine
LOCAL LEVEL DOCUMENTS/POLICIES		
Msukaligwa 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.
NEMA: Public Participation Guidelines (GNR807).	Guidelines were followed during the Public Participation Process (PPP).	Refer to Annexure 5 for all public participation information
NEMA Regulations pertaining to the financial provision for prospecting, exploration, mining or production activities (GNR1147 –20 November 2015).	Financial Provision has been calculated and will be provided for by means of an acceptable guarantee.	Refer to EMP section (PART B)
National Environmental Management: Waste Act (NEM: WA), Act 59 of 2008 as amended and its associated regulations. The regulations and various addendums pertaining to scheduled waste activities (GNR921, November 2013).	An application for a Waste License runs concurrent with this process as per the One Environmental System..	Refer to EMP section (PART B)
Spatial Planning and Land Use Management Act (SPLUMA), Act No.16 of 2013, Promulgated 1 July 2015.	The MRA is currently zoned for agricultural purposes. An application for change in land use will be required for Portion 8.	To determine the project's need and desirability

NEMA Regulation on planning and management of residue stockpiles (GNR632, July 2015).	Mine residues defined and handled accordingly.	Refer to EMP section (PART B) To be included in the IWMP
The Waste Classification and Management Regulations (GNR634, August 2013).	Mine residue classified accordingly.	Refer to EMP section (PART B) To be included in the IWMP
Assessment of Waste for Landfill (GNR635, August 2013).	Mine residues defined as Type 3 waste and handled accordingly.	Refer to EMP section (PART B) To be included in the IWMP
National Norms and Standards for the assessment of Waste for Landfill Disposal (GNR636, August 2013).	Mine residues defined as Type 3 waste and handled accordingly. Designs have incorporated a Class C equivalent barrier.	To be included in the IWMP
National Waste Information Regulation (GNR625, August 2012).	This mine must register and report on the South African Waste Information System (SAWIS).	Refer to EMP section (PART B) To be included in the IWMP
Norms and standards for the storage of waste on site as per GNR926, November 2013.	The EMPr has considered this where relevant.	Refer to EMP section (PART B) To be included in the IWMP

5.1 SPECIALIST INVESTIGATIONS

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

Table 13: 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
Noise Assessment	Neel Breitenbach	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

5.2 LEGAL REQUIREMENTS

The intent to mine requires the various applications and subsequent approvals prior to commencement. Refer to **Table 10 and Table 12** in the previous sections. To this effect, an integrated environmental application process was followed by means of S&EIR. A S&EIR process typically has four phases as illustrated by the figure below. The report is the final step in the process

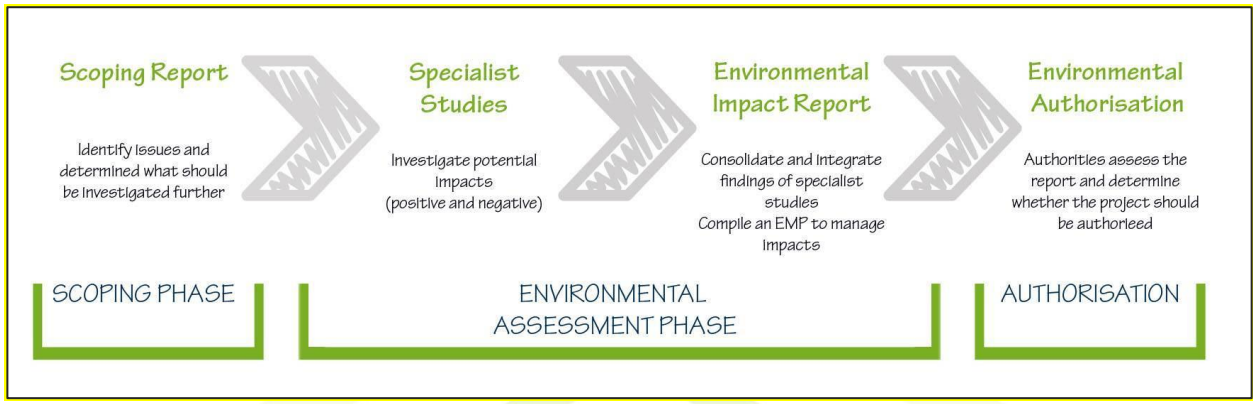


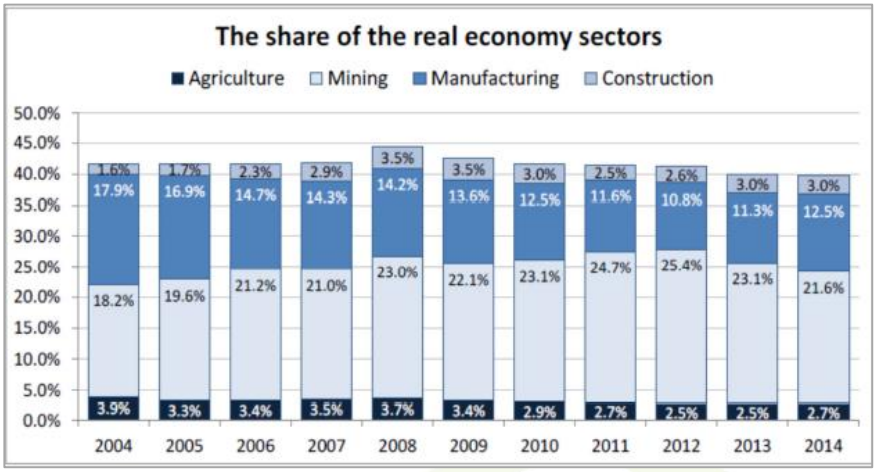
Figure 21: S&EIR flow diagram

6. NEED AND DESIRABILITY OF THE PROPOSED PROJECT

- The applicant is the holder of a prospecting right which was awarded on 05/05/2017 with reference MP30/5/1/1/3/2/1 (14429) PR for 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
- The applicant has already entered into a landowner agreement and/or lease agreement with the affected owners (only for Alternative 1)
- Eskom currently faces coal shortages at seven of its coal fired power stations (Arnot, Camden, Hendrina, Komati, Kriel, Majuba and Tutuka). Reports on the matter suggest that Eskom's current coal supply problems are as serious, if not worse, than those that existed in South Africa shortly before the load shedding of 2008 (Fin24,2018). [1] Although the Diep Vaalbank Coal model aims to produce coal for the international market, coal could be diverted to the local power stations should the need arise thereby alleviating coal shortages.
- 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 14).

[1] , https://www.fin24.com/Economy/Eskom/eskom-coal-supply-woes-may-be-worse-than-before-2008-load-shedding-reports-show-20180416).

Table 14: 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).

- The applicant has drafted a Social and Labour Plan (SLP) which outlines the Local Economic Development (LED) programmes set for the surrounding community. In line with the Social and Labour Plan, all mining contractors' employees will form part of all programmes developed for Diepsoils Investment's employees. The SLP will make it mandatory that any contractor utilised at its mining operation gives preference to local residents before appointing any persons outside the greater Msukaligwa Municipal area. In light of the aforementioned, it can be concluded that the majority and probably the entire unskilled workforce will be sourced from the greater Middelburg area and furthermore the skilled workforce will also be sourced locally if obtainable. However, due to the fact that skilled personnel (which may not be readily available in local catchment area) will be required on commencement of the mine operation, it may be necessary that start-up skilled employees be sourced from outside.

7. ALTERNATIVES ASSESSMENT

Refer to Annexure 4 for the relevant infrastructure and location maps as per the discussion below.

7.1 THE PROPERTY OR LOCATION

Two alternatives proposed and are the only feasible locations for the mining operation (see below).

Table 15: Project Alternatives

Original Alternative 1 (Preferred):	Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 5 of the farm of the Kalabasfontein 232 IS.
New Alternative 1 (Preferred)	Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 5 of the farm of the Kalabasfontein 232 IS **outside the 100m buffer** of the wetland area and with a new proposed access route which has been diverted to the north resulting in a lower environmental footprint
Alternative 2 (Alternative Site):	Mining infrastructure (footprint of 25 hectares) and mining activities on Portion 10 of the Farm Rietkuil 224 IS.

Table 16: Comparison of Site Alternative 1 and 2

ALTERNATIVE	IMPACT ADVANTAGES	IMPACT DISADVANTAGES
Site/Layout Alternatives		
Alternative 1 (**Preferred Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 5 of the Farm Kalabasfontein 232 IS	• Less sensitive heritage features • Landowner agreement is in place • More site disturbance present (including existing access crossings of the Hillslope Seep) • The site has a **lower NFEPA** wetland class rating (DEF-Heavily to Critically modified)	• There are 4 houses on the property that houses people from the local community (Zikalala Household) which would have to be relocated) • Higher noise and vibration impacts identified • Crossing of a Hillslope Seep in order to gain access
Alternative 2 **(Alternative Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 10 of the Farm Rietkuil 224 IS	• Less noise and vibration impacts identified	• Landowner opposed to project • Higher Impact on sensitive heritage features (including graves) • More significant loss of arable land and income for landowner due to existing contracts (7year validity) • The site has a **higher NFEPA** wetland rating (C-Moderately Modified)

7.2 The Type Of Activity To Be Undertaken

Underground coal mining is the preferred method of mining of the Diep Vaalbank Project. The underground will be accessed via a decline shaft whereby coal will be transferred from the underground to surface by means of a conveyor belt. The coal will then be transferred to the plant area for further processing (crushing, screening). Mine residue from the plant will be disposed of onto an integrated disposal dump. Product coal will then 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.

7.3 The Design Or Layout Of The Activity

Alternative 1 has been amended to be entirely outside of the 100m wetland buffer. An alternative access route is also proposed.

7.4 Operational aspects of the activity

At this stage, the operational aspects of the activity are related to underground mining. Where the opportunity however exists to employ different operational technologies or methods during the LOM, this will be considered and implemented. This could be associated with:

- Integrated disposal versus separate discard and slurry handling
- Handling and disposing of general and hazardous waste
- Routing alternatives
- Rehabilitation strategies
- Management/or mitigation strategies of negative impacts on site and alternatives to minimize mining related impacts on the environment and local community

7.5 The Technology To Be Used In The Activity

7.4.1 Mining Methods

Option analysis of the business case included a combination of two different mining methods with associated infrastructure and equipment requirements to determine the best-case scenario. A high-level review of the resource was conducted from the CPR geological report. The potential of open cast mining (Truck and shovel strip mining) was discarded due to the fact that the strip ratio in both target areas are significantly higher than the strip ratio's from the breakeven strip ratio analysis. Therefore, based on strip ratio's and the average mining thickness the proposed mining method would be an underground conventional drill blast board and pillar mining method. In bord and pillar mining, parallel roads are developed in the development direction. Roads, called splits, are developed perpendicular at predetermined intervals to the parallel roads

7.6 The Option Of Not Implementing The Activity

The no-go option will result in the protection of the environment *in situ* and the continued use of the land for agricultural purposes. It is however noted that the *status quo* of the present receiving environment is not pristine due to farming practices and existing infrastructure within the vicinity.

Not mining the area for coal will result in the sterilisation of the underground coal resource. The supply of coal which could meet the current demand for coal shortages locally and internationally would also not be realised. The no-go option would also prevent the socioeconomic benefits, including the need for job creation, increased socio-economic activity and social upliftment. Please refer to Section 6 for the need and desirability of the project.

The following negative impacts will however be avoided should the project no go-ahead:

- Potential surface and groundwater pollution associated with the Olifants River Catchment
- Loss of natural habitat and faunal disturbance
- Additional traffic loads and on the local road network (including the R38 and local access roads utilised by local farmers)
- Increased noise and dust levels (PM10 and PM2.5)
- Potential decant of acid mine drainage during post closure (as a result of the sulphides) which may result in significant water quality modification in the Klein Olifants drainage area
- Lowering of the water table in the coal seam aquifer as a result of mine dewatering
- Sense of place for the surrounding community and land users
- Loss of agricultural land/grazing land (current land use)

8. PUBLIC PARTICIPATION PROCESS (PPP)

8.1 Details Of The Public Participation Process Followed

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. Refer to the PPP report in Annexure 5 for the full details of the PPP carried out to date.

Table 17: Public Participation Process Undertaken

DATE	PUBLIC PARTICIPATION PROCESS	PHASE
19 September 2017	Placing of site notices at conspicuous places around the site including the Bethal and Hendrina libraries.	SCOPING PHASE
27 September 2017	1st consultation with landowners	
27 September 2017	Draft Scoping Report Announcement to all I&AP's with BID	
22 September 2017 29 September 2017	Newspaper Adverts placed (Ridge Times and the Middelburg Observer)	
26 September 2017 - 26 October 2017	Providing IAPs (including relevant State Departments) with the opportunity to review and comment on the Draft Scoping **(30 days PPP)**	
04 October 2017	Reminder sent to all I&AP and landowners on the proposed project and opportunity to review and comment on the Draft Scoping **(30 days) – with the PP Open-day/meeting scheduled for 06 October 2017**	
06 October 2017	1st Public Open Day at the Bethal Public Library during the Scoping Phase	
23 October 2017	2nd Landowner Consultation	
27 October 2017	Final Scoping Report submitted to DMR	
22 November 2017	Pre-application meeting with DWS	EIA PHASE
13 November 2017	The sending of Background Information Documents to affected parties via registered post, email, hand delivery, email and courier to land owners, adjacent landowners, relevant State Departments and other identified parties deemed relevant to the application. Relevant State Departments include:	

	DMR, DWS, Gert Sibande District Municipality, Msukaligwa Local Municipality, Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA), Department of Agriculture, Forestry and Fisheries (DAFF), Mpumalanga Tourism and Park Agency (MTPA), Transnet, Eskom, DEA, Transnet etc	
05 December 2017	3rd Further consultation with landowners	
03 February 2018	Invitation to comment sent to all I &AP's on the Draft EIA Report	
02 March 2018	E-mail invitation to comment sent to all I &AP's on the Draft EIA Report	
05 March 2018 – 19 April 2018	Providing IAPs (including relevant State Departments) with the opportunity to review and comment on the Draft EIA Report **(31 days PPP)**	
10 April 2018	2nd Public Open Day at the Bethal Public Library at the Bethal Public Library during the EIA Phase	
17 April 2018 –09 May 2018	Providing IAPs with additional time (20 days) to comment on the layout change for Alternative 1	
Further Consultation with I&APs	An independent Social Specialist was appointed to undertake more in-depth consultation with affected parties during the EIA process. Mr Jessica de Beer from Gibb Engineering undertook the study. The results of her study have been integrated into this Final EIA Report. The full report can be accessed in Annexure 6.	

9. SUMMARY OF ISSUES RAISED BY I&APS AND RESPONSES

Table 18: Summary of the issues raised by the various I&APs and authorities to date, and the EAP's response/feedback thereto

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				
Ludolf Uys - Regen Waters Trust Portion 10 of the Farm Rietkuil	05/12/2017 Discussion with landowner (Mr Fred Kadish) on farm Subsequent notification sent via email	Opposed to project due to loss of arable land and existing contracts	Your objection has been noted. Alternative 1 (Kalabasfontein) will be recommended in this case.	
Owner of Fremax Farms (including all Vaalbank and Kalabasfontein Farm portions) Mr Darrel Kadish Mr Fred Kadish ***(Related to Alternative 1)*** ***Father and cousin stays on Farm***	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 farm portion (Portion 11 of the Farm Rietkuil),	26/03/2018	Mr. Michael C. Erasmus, has expressed his concern over the use of the main gravel road that connects with the R38 which at present runs	The relevant maps were sent to Mr Erasmus as requested. His concerns have been noted and explained within	Your comment and concerns on Alternative 2 has been received and noted. Your

Mr. Michael C. Erasmus, ***(Related to Alternative 2)***	Comment received via email and subsequent telephonic discussion Further discussions were held with Mr Erasmus during the EIA Open Day on 10 April 2018	through his farm. His concerns relate to sever noise and air quality impacts (mainly dust) that would impact the health of his family (his wife is very susceptible to dust particles and is currently ill). He is also concerned that the additional dust pollution will affect the viability of his sheep farming business. He predicts that the quality of their wool will be compromised and that the current grazing capability of his land will decline. Should the proposal go ahead, the applicant will have to buy out his land.	the Final EIA Report that will considered by the DMR during the decision-making process.	concerns have been relayed in this report.
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 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.	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). .	Your comment has been received and noted. Refer to Annexure 5 for the public participation information

		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.		
Platorand Verspreiders CC Riaan van Rensburg	04/10/2017 Registered Post sent			
Landowner Carel Johannes Kruger	04/10/2017 Registered Post sent	Kallie Steenkamp 083 461 2969. and Carel Kruger and Kallie will handle all negotiations of the family		
Bankpan Meyer de Jager V (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. Ecoelementum invited the Rietkuil Beneficiary Group to a stakeholder engagement session (**05 April 2018 on site)** to further discuss their concerns, All members were individually invited via email. Due to the low level of responses received (only 2 members confirmed that they will not be able to attend) it was decided to cancel the meeting. All members was again invited to attend the public open day on 10 April 2018. No members attended the open day	

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	Ecoelementum invited the Rietkuil Beneficiary Group to a stakeholder engagement session (**05 April 2018 on site)** to further discuss their concerns,	
Rietkuil Beneficiary Group Mrs Louise Gouverneur X	24/10/2017	Same as above	All members were individually invited via email. Due to the low level of responses received (only 2 members confirmed that they will not be able to attend) it was	

Rietkuil Beneficiary Group Mrs Martine Nolte X	24/10/2017	Same as above	decided to cancel the meeting. All members was again invited to attend the public open day on 10 April 2018. No members attended the open day	
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. 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.	Refer to comment above Thank you for comment, you have been added to the stakeholder database and will be informed of the process going forward.	
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.		
LANDOWNERS OR LAWFUL OCCUPIERS ON ADJACENT PROPERTIES				
MUNICIPAL COUNCILLOR				

Cllr Joseph Mtsweni (ward 15) cllrmmtsweni@govanmbeki.gov.za; mmapike@gmail.com; nomusa.kumalo@yahoo.com and kumalonomusa42@gmail.com	07/03/2018 Email received with contact details Email and Notification Sent	10 April 2018 (at the public open day) Cllr Joseph Mtsweni stated the he is a spokesperson for the local community and represents the local businesses. They want to form a business forum with the mine and provide their local services. This will also promote employment growth in the area and opportunity		
ORGANS OF STATE - (RESPONSIBLE FOR INFRASTRUCTURE THAT MAY BE AFFECTED ROADS DEPARTMENT, ESKOM, TELKOM, DWA)				
District Municipality Gert Sibande Municipality X	04/10/2017 Report and letter sent via Registered Post and hand delivery			
Municipality Msukaligwa Local Municipality X	26/09/2017 Report and letter sent via Registered Post and hand delivery			
Transnet Thami Hadebe X	Registered Post and Emailed	Not Affected by (Director: Environmental Management the proposal.	Noted	
SANRAL Klaus Schimdt	Email 4 Oct 2017 Registered Post: 4 Oct 2017			

ESKOM Noxolo Galela – Land Management Milton Moloko	26/09/2017 Registered Post and Emailed			
Dept. Land Affairs (Commission On Restitution of Land Rights) X	22/10/2017	No claims have been lodged against the properties	Noted	
Dept. Environmental Affairs MDEDET (now DARLEA) Musa Mondlane (Director: Environmental Management) X	26/09/2017 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	A Water Use License Application will be lodged in due course	
National Department of Environmental Affairs Obed Baloyi OBaloyi@environment.gov.za	BID and Notification emailed on 03/11/2017	No comment has been received		

Department of Agriculture, Forestry & Fisheries Mpumalanga (Soil and Land Use Department) Musa Mondlane Doreen Sithole	Registered post and email sent on 4 Oct 2017	No Further comment received		
South African Heritage Authority	Report uploaded unto the SAHRIS website	Comment not yet received		
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. 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.	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.	
Msukaligwa farmers association	Information letter Emailed on 4 Oct 2017	No further communication received		
Traditional Leaders			**No comment**	**N/A**
OTHER				

Chamber of Mines Babalwa Matiwane	Registered Post sent on: 4 Oct 2017	No comment received		
Bird Life SA	Emailed on 04/10/2018	No comment received		
Business Forum Thulani Maseko	Attended the open day on 06/10/2017	Registered as an I&AP: 6 Oct 2017		

10. THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES

10.1 Description Of The Current Land Uses

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.

10.1.1 Land Conversion

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.

Conversion of farming activities to mining related operations will include a rehabilitation and Closure Plan as prepared as part of the EIA Report (Annexure 6).

10.2 Type Of Environment Affected By The Proposed Activity

10.2.1 Climate and Air Quality

Methodology and Data Sources

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

Regional Setting

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.

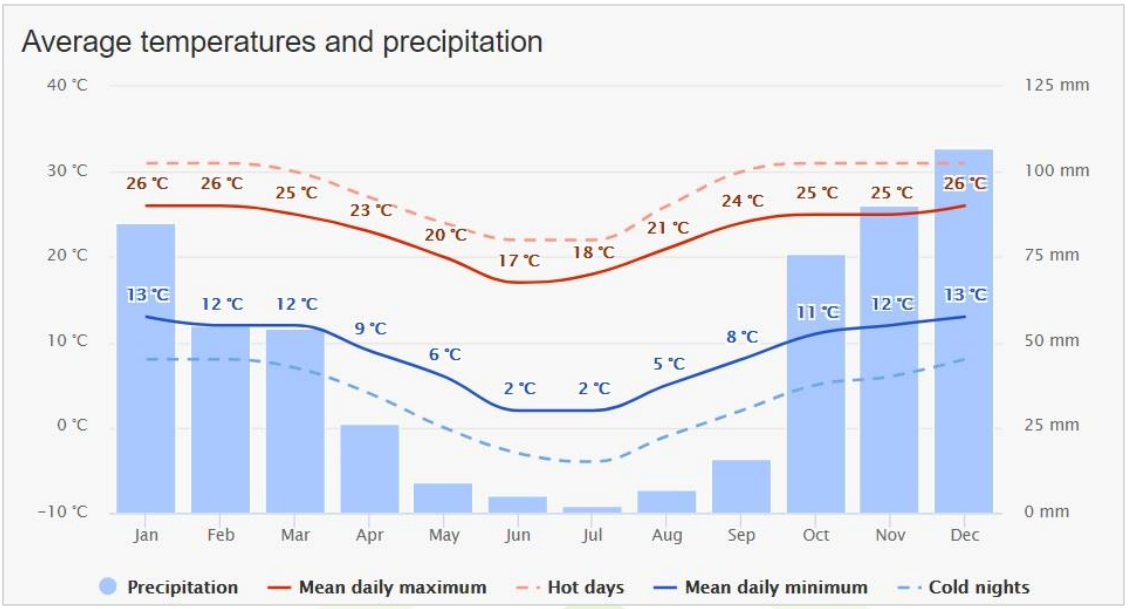


Figure 22:Temp and precipitation simulation results from the NEMS model for the proposed Diep Vaalbank Coal project area (1985 - current).

10.2.1.1 Site-Specific Dispersion Potential

A period wind rose for the site is presented in **Error! Reference source not found.** below. Wind roses comprise of 16 spokes which represents the direction from which winds blew during the period. The colours reflect the different categories of wind speeds. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories. Based on an evaluation of the meteorological data simulations run from a global NEMS weather model at ~30km resolution from 1985 to current of the project area. The following deductions regarding the prevailing wind direction and wind frequency can be assessed. Looking at the Figure below, 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 (Figure 24).

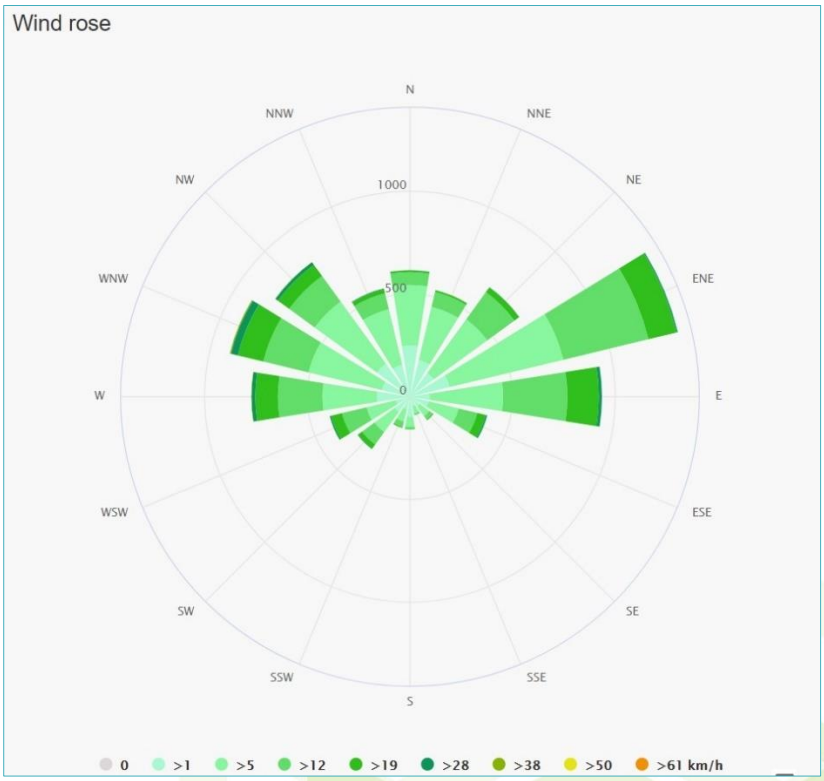


Figure 23: Wind Rose for the period 1985 to current

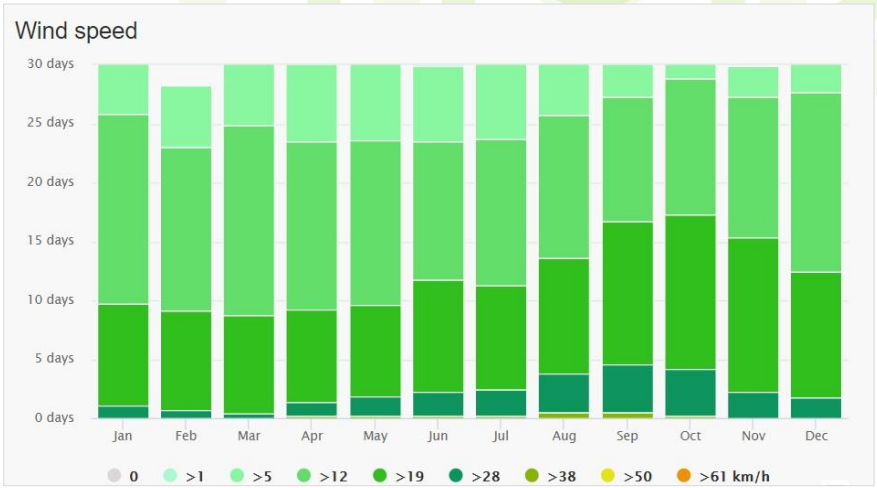


Figure 24: Wind Class Frequency Distribution per month

10.2.1.2 Precipitation

Precipitation cleanses the air by washing out particles suspended in the atmosphere (Kupchella & Hyland, 1993). It is calculated that precipitation accounts for about 80-90% of the mass of particles removed from the atmosphere (CEPA/FPAC Working Group, 1999). The total precipitation predicted at the Diep Vaalbank project area is shown in **Error! Reference source not found.** below. The highest precipitation days are predicted during the months of October to March. During these months' precipitation is predicted to only occur 13 to 22 days on average. The rest of the year precipitation is predicted to occur less than 6 days per month.

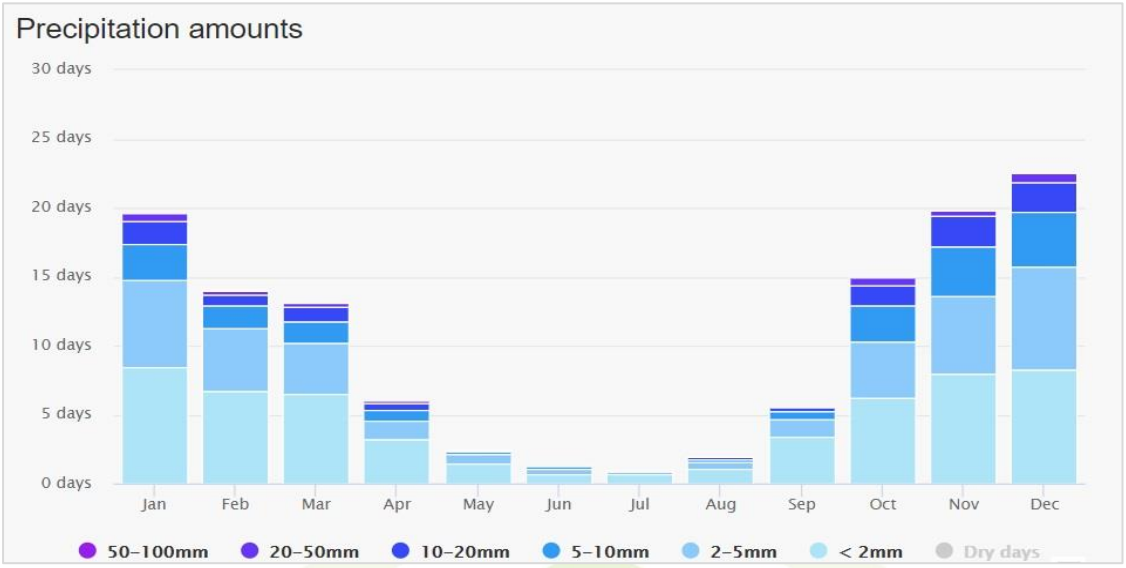


Figure 25: Day count of total daily precipitation per month for the proposed Diep Vaalbank Coal project area for the period 1985 - current

10.2.1.3 Air Quality Impacts

Sensitive receptors identified in the immediate vicinity of the study area and proposed project area have been listed below;

- Community homesteads
- Residential areas
- Agricultural cultivated and grazing lands (not marked on map)

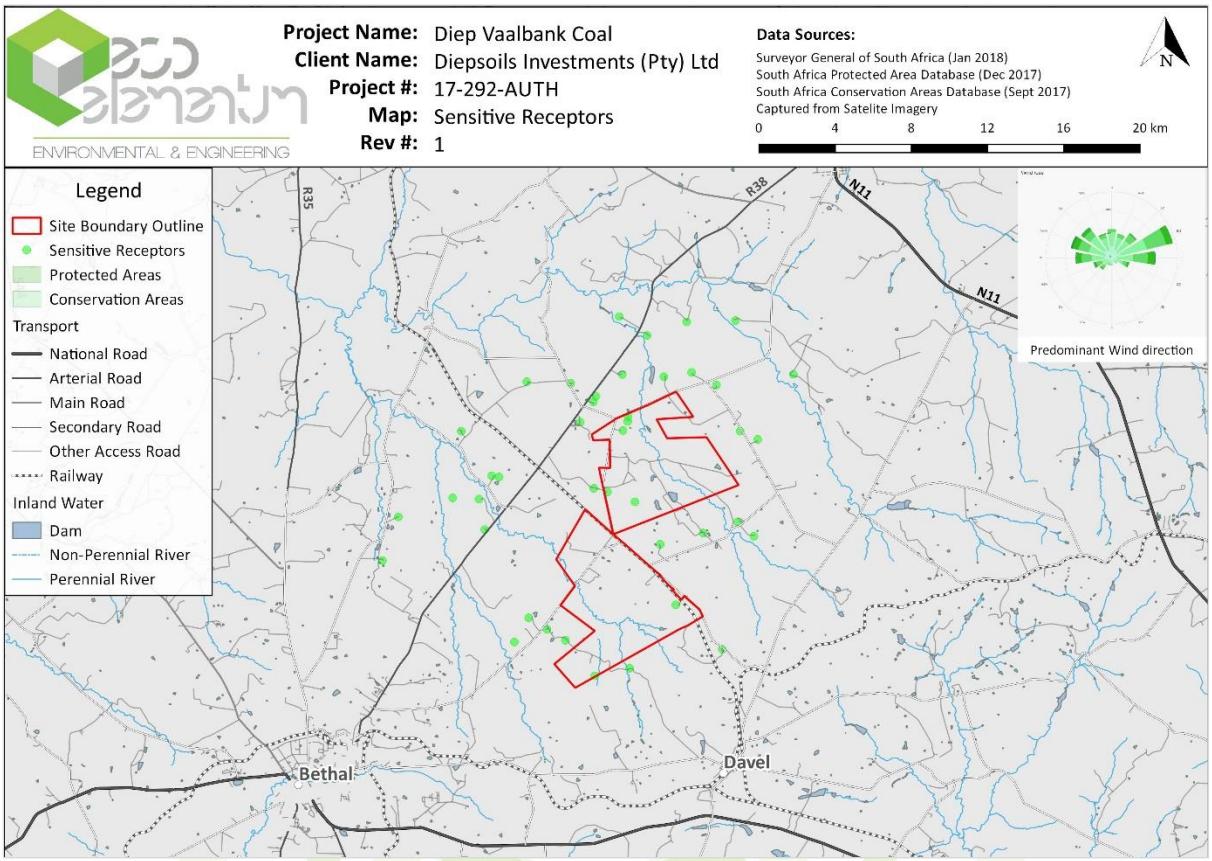


Figure 26 Sensitive Receptors (Air Quality):

Pollutants of Concern

- Fugitive dust (Containing TSP - Total Suspended Particulate) including PM10 and PM2.5
- Carbon dioxide (CO2), Carbon Monoxide (CO), Hydrocarbons (carbon and hydrogen), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2)

Potential Impact Sources

- Emissions by means of crushing and screening (the crushing and screening process represents a significant source of fugitive dust with high quantities of respirable fractions released to the atmosphere)
- Haul road for transporting the ROM. (significant)
- Clearance and removal of topsoil, loading of material, hauling, grading, stockpiling, bulldozing and compaction
- Transportation of the workers and materials in and out of mine site will be a constant feature during the construction phase.
- Material Handling (Loading, Hauling and Tipping)
- Construction of ventilation shafts, incline shaft portal, access roads, pipes, storm water diversion berms, change houses, admin blocks, drilling, blasting and development of box cut and decline shaft for mining
- Use and maintenance of access roads (access roads on-site were identified as the second most significant source of dust emissions)
- Dust from material handling.

10.2.1 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 top cadastral 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%.

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

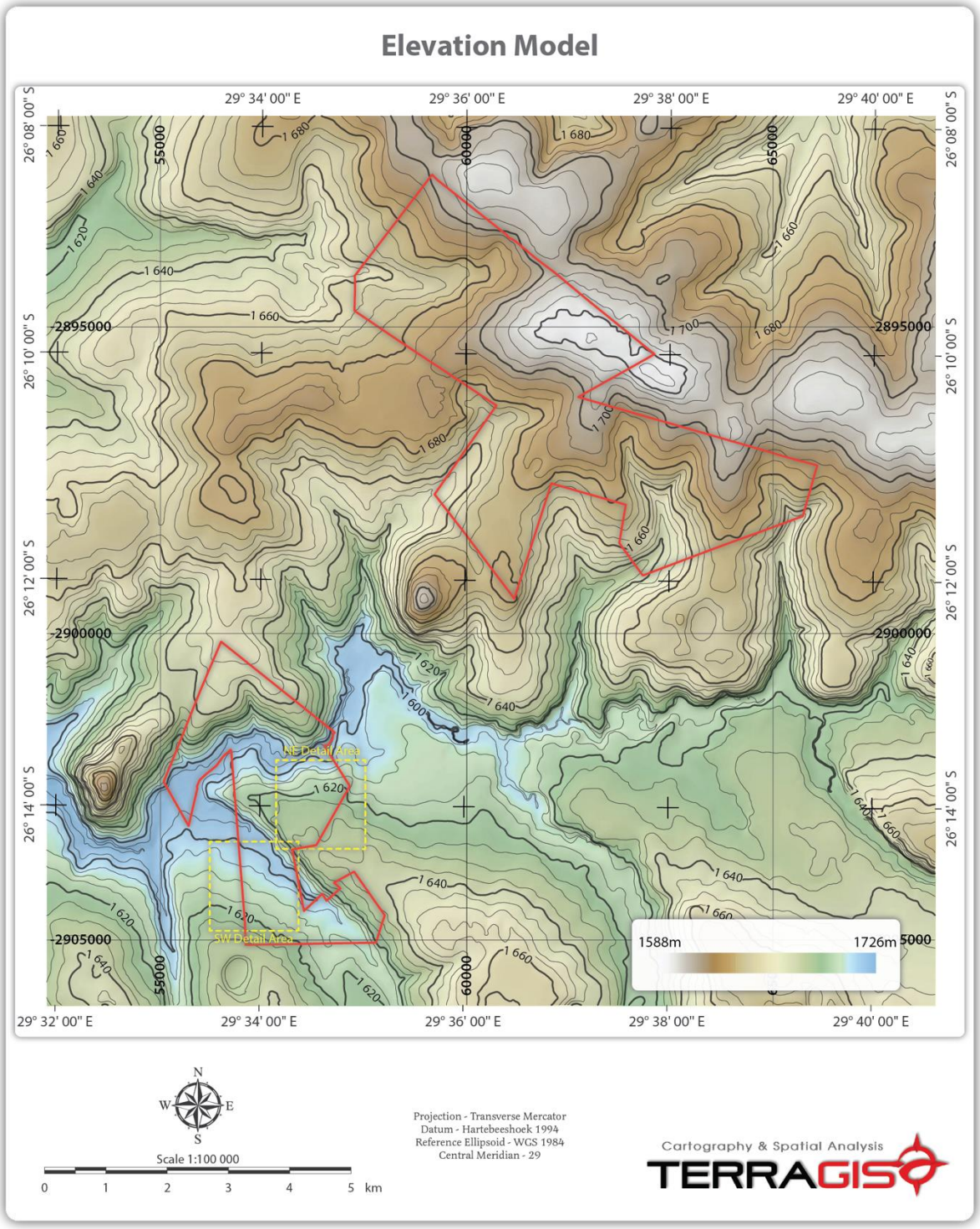


Figure 27: Topography and Elevation Model

10.2.2 Soil Forms and Land Capability

Methodology and Data Sources

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

Soil, land use, land capability and agricultural potential study for Diep Vaalbank Coal (Rossouw Associated, 2018).

Ten different soil forms were identified within the three site alternatives assessed (Figure 28). These soil forms include oxidic forms where red or yellow-brown apedal horizons dominate the depth of the profiles observed. Whereas the southwestern sites (preferred site at the top and alternative site 2 at the bottom) are dominated by soils with apedal soils with distinctive red colours, the site located in the northeast (alternative site 1) is dominated by yellow-brown colours in the B1-horizon. These forms can be classified into two main land capability classes following the system of the Chamber of Mines i.e. arable and grazing land capability. All three sites have soil with hydromorphic properties and wetland capability as well as soil with high potential for arable agriculture.

10.2.2.1 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. Refer to Figure 29

Photo 1: Grazing land south of Alternative 1

Photo 2: Area to the north of Alternative 1

.

Photo 3: Cultivated Land at Alternative 2

Photo 4: Grazing land west of Alternative 2

Table 19: 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

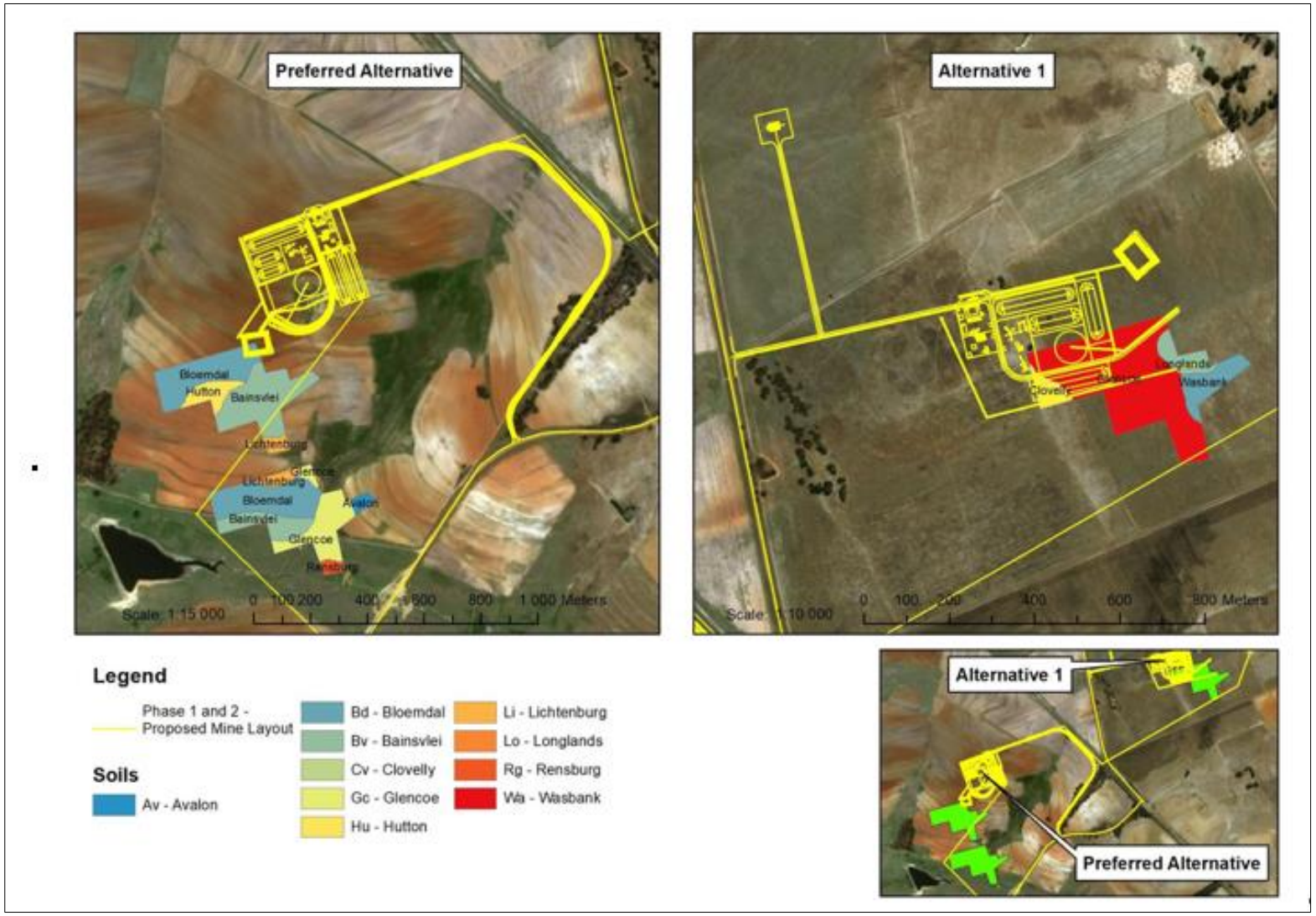


Figure 28:Depiction of proposed surface infrastructure layout superimposed on the *in-situ* soil forms

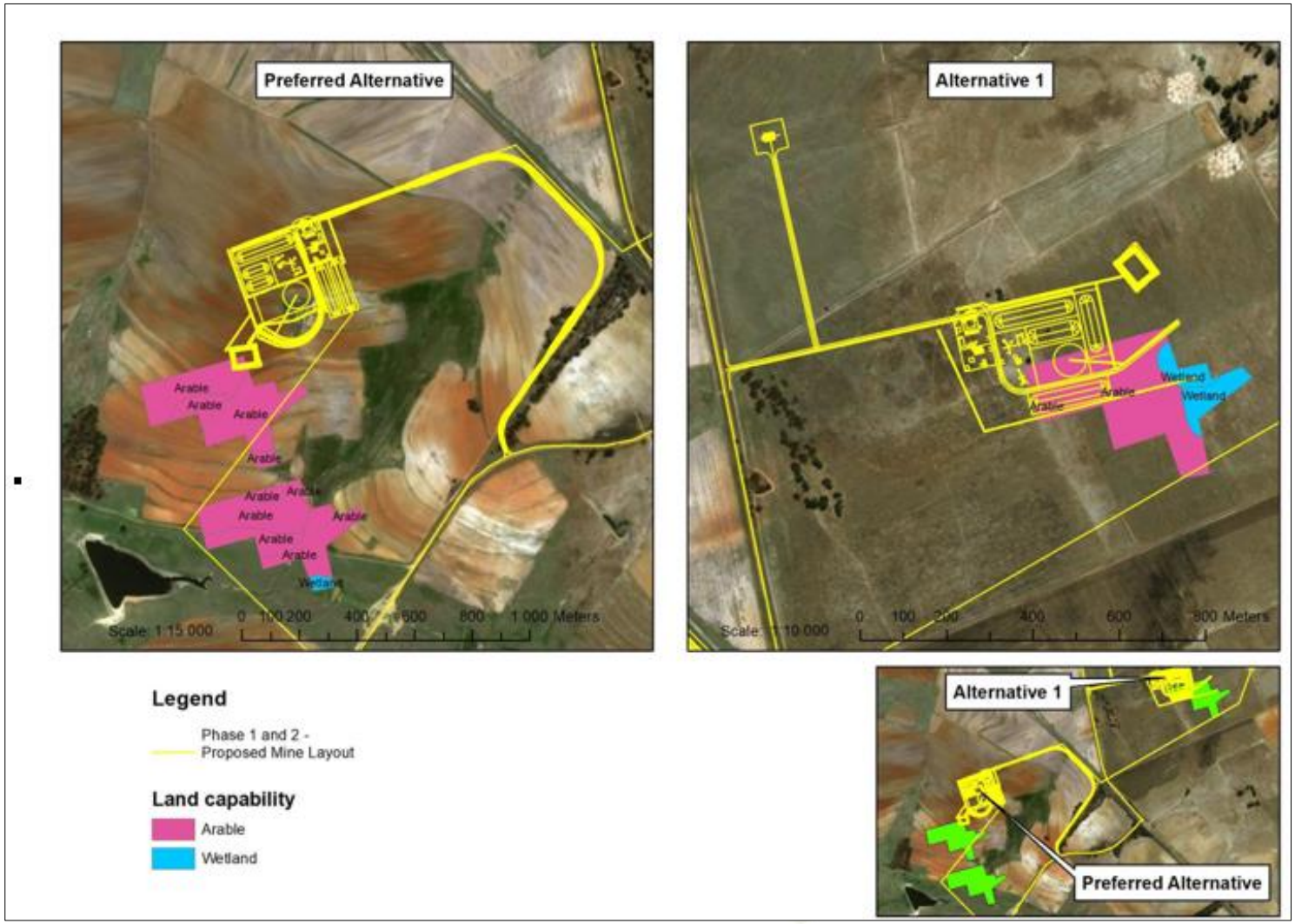


Figure 29:The current proposed surface layout superimposed on the land capabilities of the sites surveyed

10.2.2.2 Soil and Land use Impacts

- 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.
- Oxidation of stockpiled coal and waste material: The storage of coal and waste rock, which can contain coralliferous 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 coralliferous 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.

10.2.3 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)

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.

10.2.3.1 Terrestrial Biodiversity Overview

With reference to Figure 30 it is evident that the wetland units at Diep Vaalbank Coal Mine fall within an area that is regarded in terms of the Mpumalanga C-Plan as Category 4, 5 and 6. These relate to “Important and Necessary”, “Least Concern” and “No natural habitat remaining”. The areas of higher classification (4 – Important & Necessary) are predominantly surrounding the wetland areas.

10.2.3.2 Olifants Catchment

The Olifants catchment surrounds an area of about 54 570 km$_2$ and is subdivided into 9 secondary catchments with a mean annual runoff of about 2400 million cubic metres. The water resources within the upper Olifants WMA are mostly degraded and mainly have a PES (Present Ecological State) of an E due to the high concentration of coal mining activities, large dams and

urbanisation. The water resources and habitat conditions are slightly better within the B11A catchment. The ecological importance is also mostly low throughout most of the reaches within the upper Olifants catchment. There are however still a large number of wetlands present within the upper reach of the catchment which also has an improved PES and high ecological importance.

The site falls within the Eastern Highveld Grasslands vegetation type. The area is also associated with several important wetland systems which are constantly influenced by acid mine drainage water and Coal mine deposits which have long since had an influence on the potential status of these associated wetland systems. Agricultural activities have also caused stream diversions and overgrazing in some areas. An increase in access roads have also caused land and riverbed erosion which have also affected habitat conditions for fish and aquatic macro invertebrates. For a prolonged period, the quality of surface and ground water in many parts of the catchment fails to achieve the guideline values for aquatic ecosystems set by the Department of Water Affairs and Forestry (DWAF).

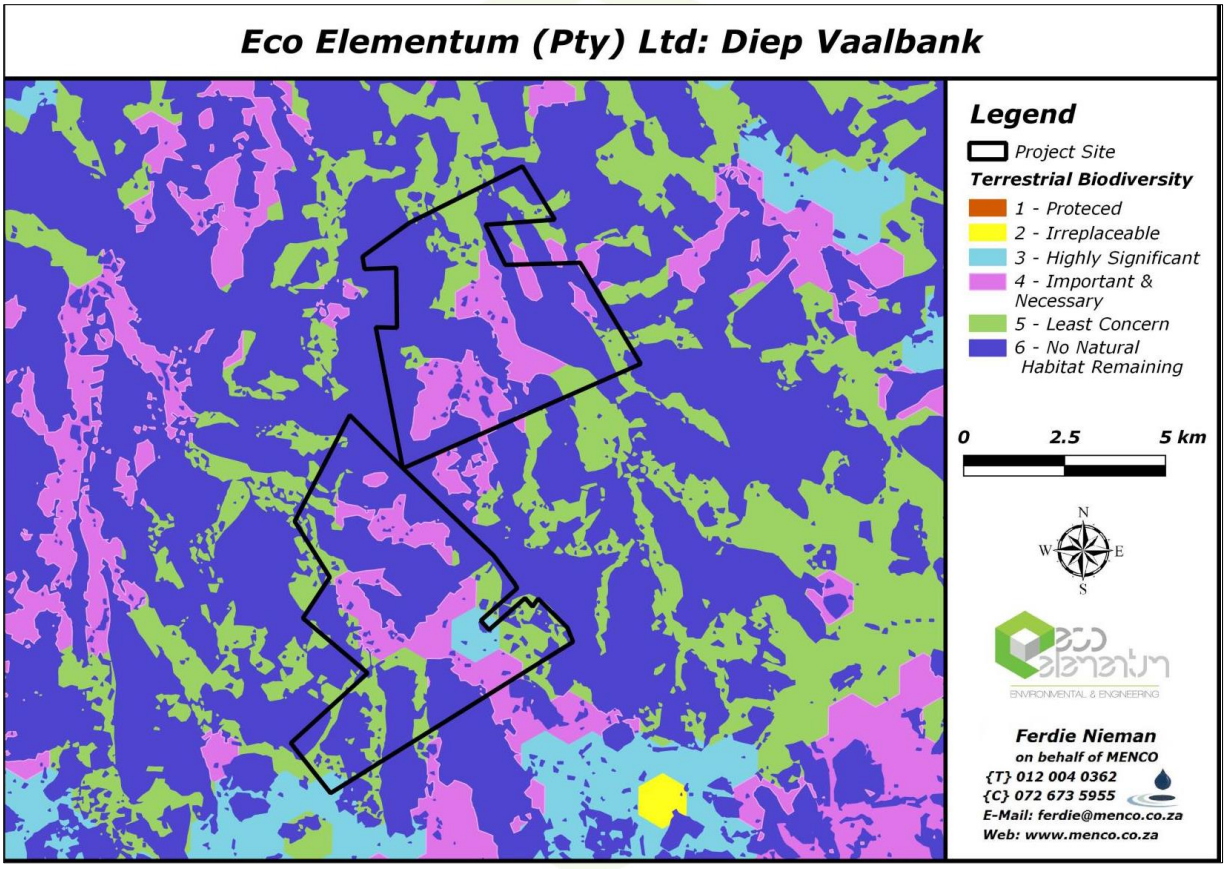


Figure 30:Terrestrial Biodiversity Assessment for Diep Vaalbank Coal

Table 20: Background Information relevant to the water resource

Reference/Source	Licensee Results
Water User	Tala Coal Bethal
River	Olifants River
Quaternary	B11A
DWA RQO EISC	Low/Marginal
DWA RQO PESC	***Class C (Moderately Modified)***
Rec. Ecological Category	***Class C (Moderately Modified)***
SANBI 1999 PES	***Class C (Moderately Modified)***
SANBI NFEPA Status	Low Priority

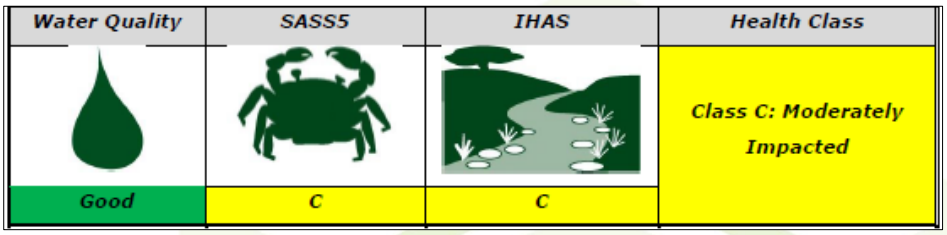


Figure 31: Catchment Ecological Status

10.2.3.3 Wetlands and Ecological Status

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**. Existing impacts observed on site include:

- Access and haulage roads with associated bridges and culverts transecting the wetland areas are contributing towards erosion and bank destabilisation;
- Erosion along water contour outlets from the cultivated areas towards the stream has led to bank destabilisation and increased sedimentation;
- Presence of some alien vegetation encroaching onto the wetland systems.

However, from an Ecological Status point of view the Health Class is given as Good or Moderately Modified. This relates to a system that has been moderately impacted to a level of partial acceptability. This is seen as ecologically sustainable and is usually a sign of a river or system in overall good suitable conditions for aquatic ecosystems. A quick identification of the catchment is indicated below.

Table 21: Summarised Result for the Wetlands at Diep Vaalbank Coal Mine

Quaternary	Coordinates	Wetland	PES	EIS	Confidence	REC
B11A	26°20'35.76"S 29°35'11.04"E	Floodplain	B	High	High	B
	26°20'40.60"S 29°36'7.59"E	Channelled Valley Bottom	C	Moderate	High	C
	26°19'4.84"S 29°37'17.15"E	Pan/depression	B	High	High	B
	26°20'5.37"S 29°36'30.52"E	Hillslope	C	Moderate	Moderate	C

Photo 5:Channelled Valley Bottom Wetland Photos south east of Alternative 1

Photo 6: Photo of existing access road crossing Hillslope Seep (Alternative 1)

10.2.3.4 Surface Water Impacts

- 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
  Vegetation degradation and reduced wetland functionality due to the construction of an access road through a Hillslope Seepage

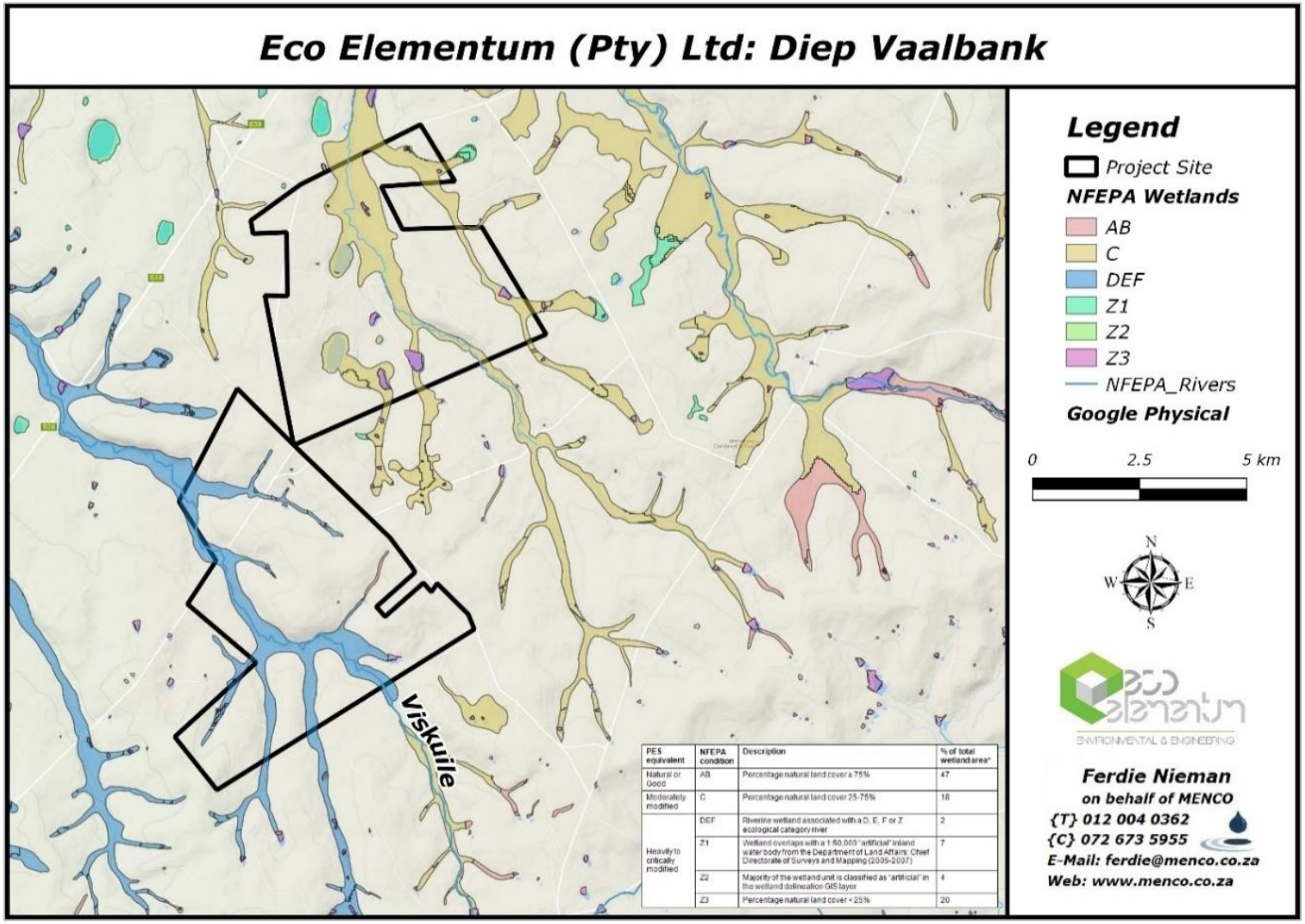


Figure 32: NFEPA Wetlands with the site boundaries

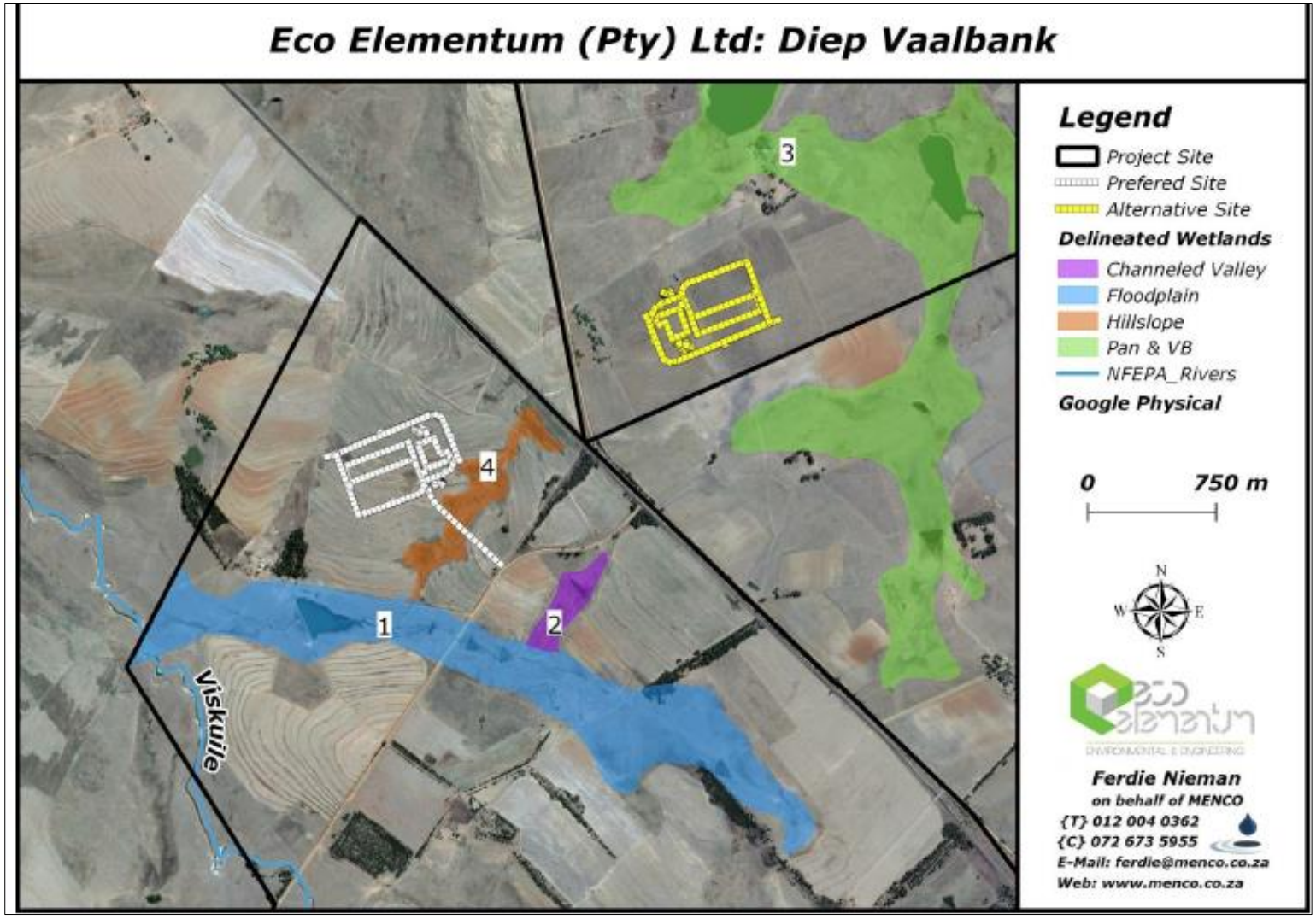


Figure 33: Delineated Wetland with buffers

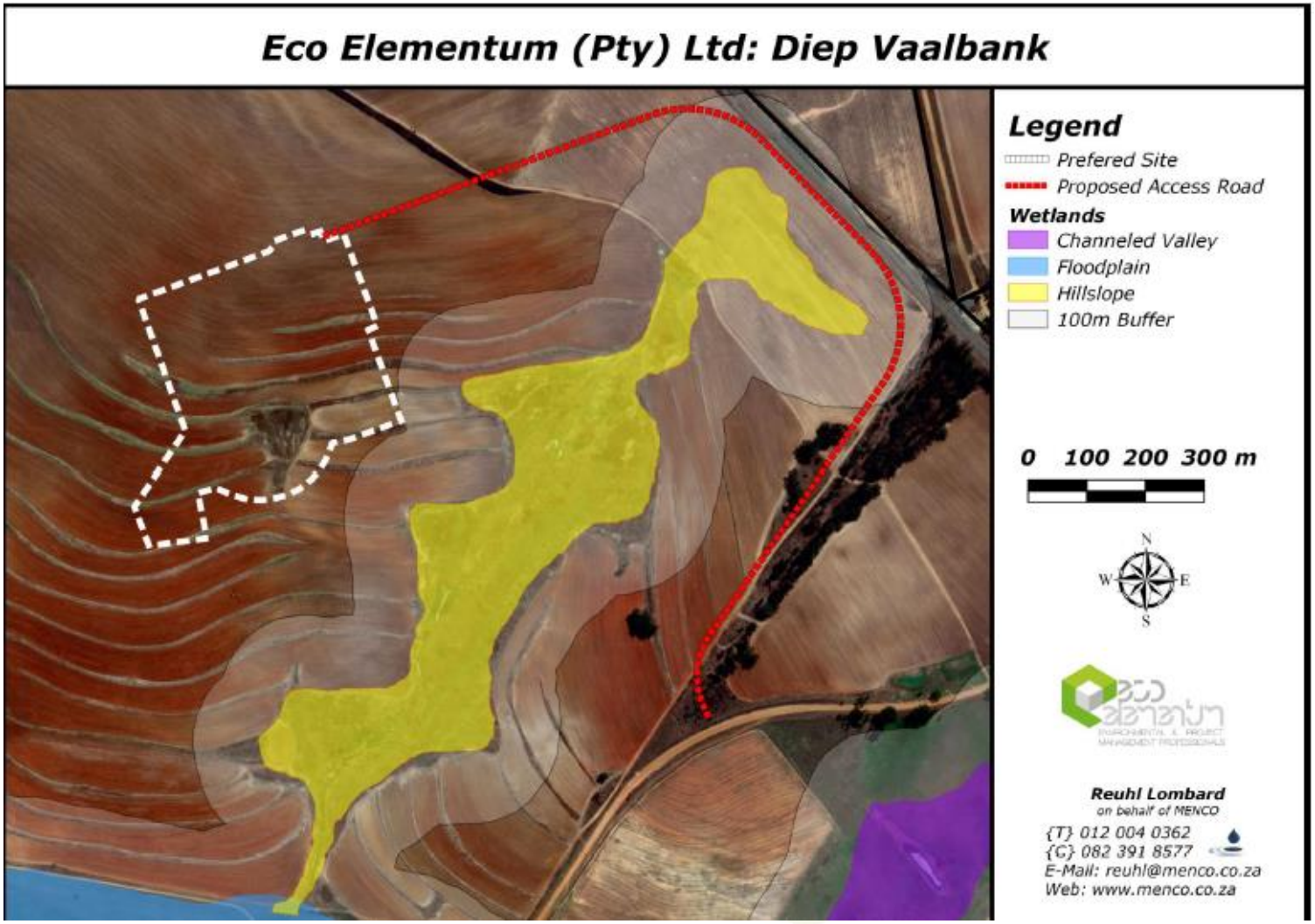


Figure 34: Alternative 1 Delineated Wetland with buffers and alternative road

10.2.4 Groundwater

- **Methodology and Data Sources**

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

10.2.4.1 Aquifer Classification and Vulnerability

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.

10.2.4.2 Boreholes

Twenty-three (23) boreholes were found during the hydro census (as per Figure 35). 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.

10.2.4.3 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.

10.2.4.4 Groundwater Level

- 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.

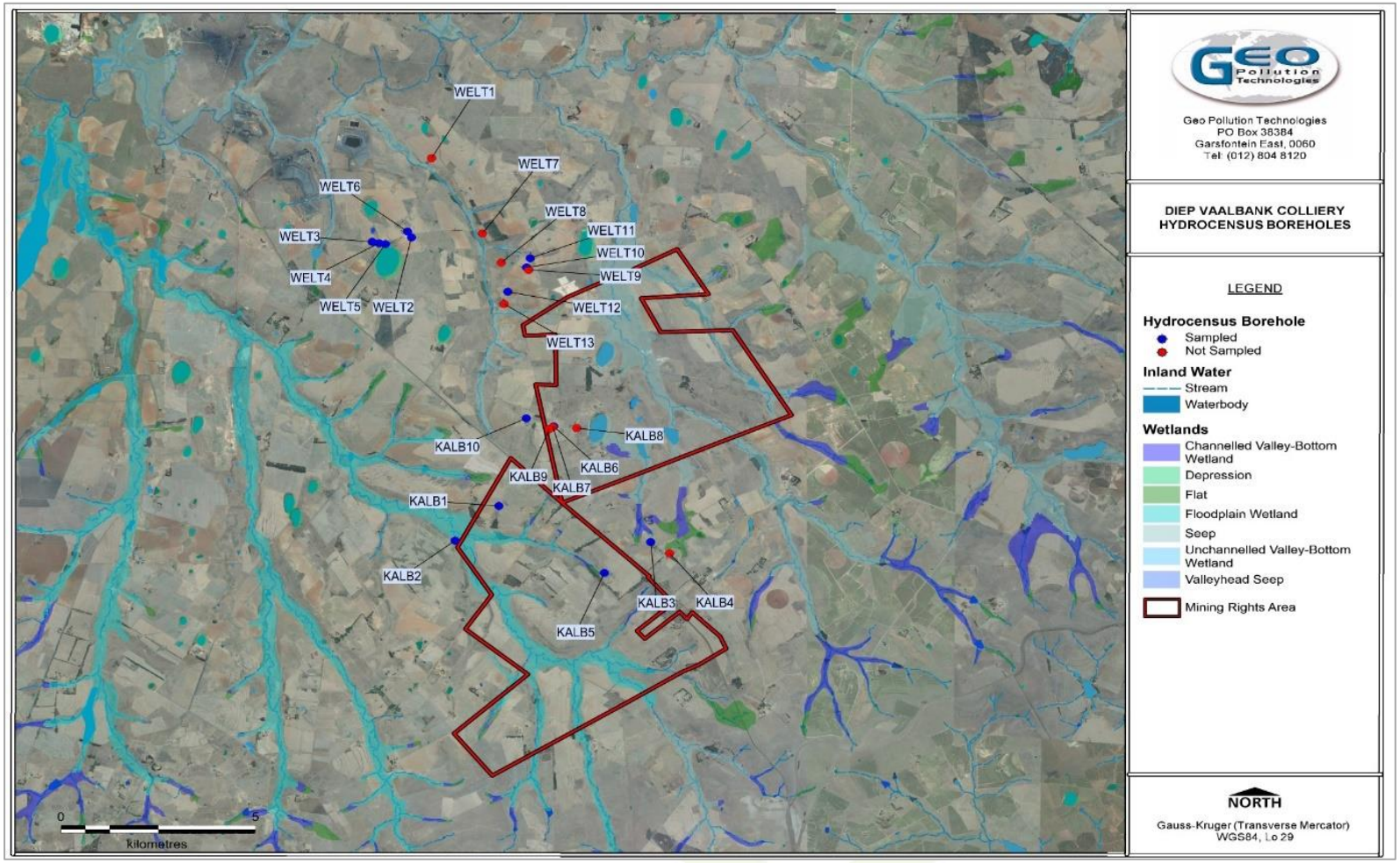


Figure 35: Hydro-census Borehole Locations

10.2.4.5 Groundwater Water Impacts

- 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.
- Mining Infrastructure that could be sources of groundwater pollution include:

    - Workshops: Fuel storage;
    - Mine access boxcut;
    - Surface stockpiles: Topsoil stockpile; overburden stockpiles, discard stockpile, discard dump, ROM stockpile.
    - Plant and process related Infrastructure: Process plant; Product stockpiles;
    - Water management infrastructure: Process water tank; underground water reservoir.

- Cease of dewatering activities during decommissioning and post-closure (groundwater within the mined areas is expected to deteriorate due to chemical interactions between the geological material and the groundwater. The resulting groundwater pollution plume is expected to commence with downstream movement).
- Stockpiles and overburden dumps not removed during decommissioning and closure phase (continued groundwater contamination is likely to be released)
- Post Closure (after closure, the water table will rise in the mine to reinstate equilibrium with the surrounding groundwater systems. However, the mined areas will have a large hydraulic conductivity compared to the pre-mining situation).
- Post Closure (groundwater rebound and decant due to the influx of water (i.e. rainfall events) into the mine void.
- Post closure with remaining discards and exposed reactive mineral surfaces contain sulphate (spread of water pollution to surrounding areas).
- Acid mine drainage conditions can be expected to form as shown from the ABA testing that was done.

10.2.5 Geology

Methodology and Data Sources

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

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 20 km to the south west of the project area near Bethal as shown in Figure 36

Quaternary alluvium associated with the wetlands crosses larges areas of the mining area.

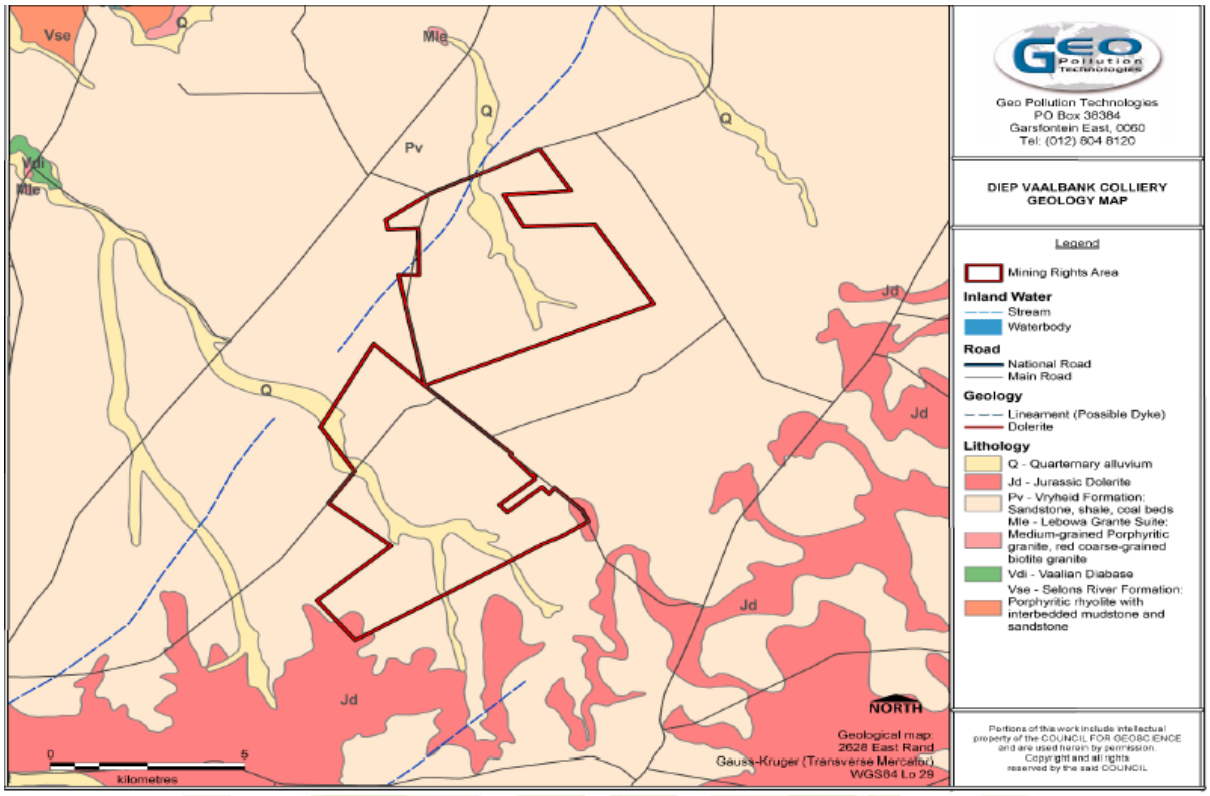


Figure 36: Geological Map

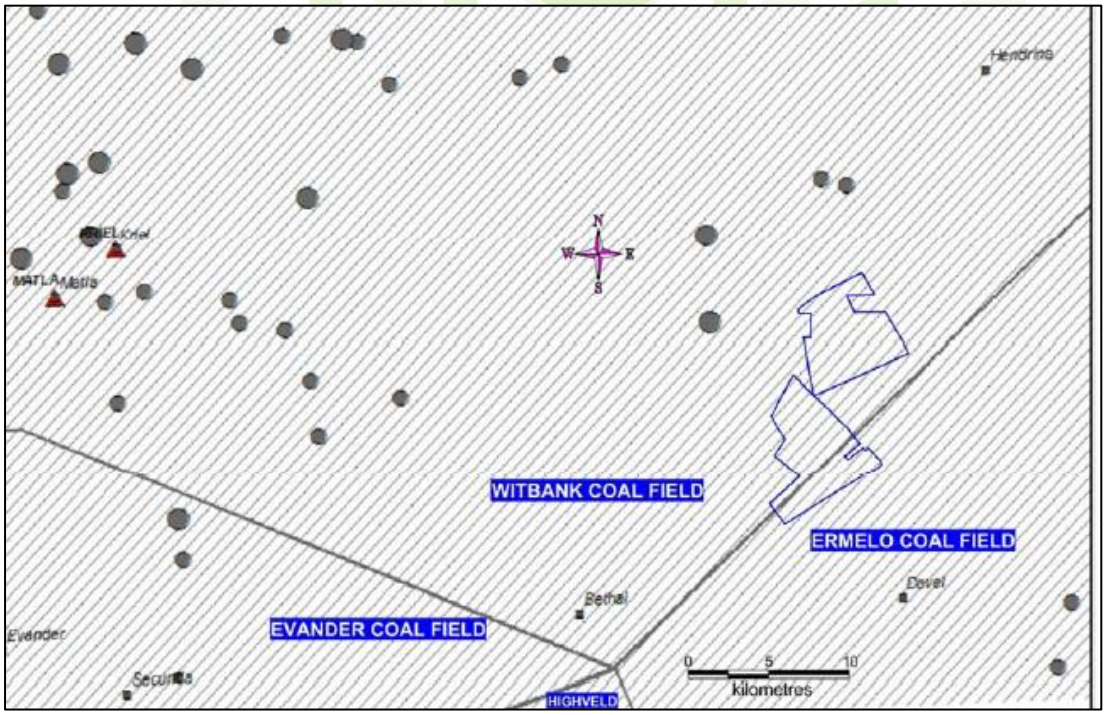


Figure 37: Distribution of known Coal Fields relative to the Diep Vaalbank Colliery Project

10.2.6 Flora

Methodology and Data Sources

- Ecological Investigation (Ecoelementum, 2018)

The Southern African region contains nine (9) biomes namely, desert, succulent Karoo, fynbos, Nama-Karoo, grassland, savannah, Indian Ocean coastal belt, Albany thicket and forest. Mpumalanga Province contains three of South Africa's nine (9) biomes: Grassland (Highveld and escarpment hills), Savanna (escarpment foothills and Lowveld) and Forest (south and east facing escarpment valleys) (Ferrar, Tony A & Lötter Mervyn C, 2007). The study area falls within the Grassland biome of South Africa and specifically in the Mesic Highveld Grassland Ecoregion/Bioregion.

The ecoregion draws its name from the high interior plateau known as the Highveld, and the expansive cover of species rich communities of grasses. The ecoregion is bordered by the Drakensberg in the east, the arid Karoo and Kalahari in the west, and the low-lying bushveld to the north. The Highveld Plateau is fairly flat with elevations varying from 1,400 m to 1,800 m. The flat topography means that the landscape is traversed by many meandering rivers, with the grassland community historically playing an important role in natural water purification of the westward flowing rivers that originate on the Drakensberg escarpment (Davies and Day 1998).

On a smaller scale the study area is located within Eastern Highveld Grassland (Gm 12) (Mucina & Rutherford (Eds), 2006). Some of the areas within the site cannot be considered representative of this vegetation type due to the disturbance levels from former and current agricultural activities, frequent heavy burning and alien plant infestation, but some stretches are representative and appear to be in good ecological condition. ***The area under study is moderately to heavily modified***.

The grassland habitat that has remained in a near pristine state is found mostly in nature reserves. The main protected areas are Valei, Nooitgedacht Dam, Bronkhortspruitdam, Vaal Dam, Willem Pretorius, Rustfontein Dam and Koppies Dam Nature Reserves, and the Ermelo Game Park. Together with a number of smaller reserves, these currently conserve only 0.5 percent of the ecoregion. Even the areas of grassland habitat that have remained in a near natural state are declining steadily in area and quality. The present state of fragmentation, together with anthropogenic changes planned for the coming years may lead to the extinction or near extinction of some larger animal species, such as the Blue Crane (*Anthropoides paradisea*) (Allan 1992).

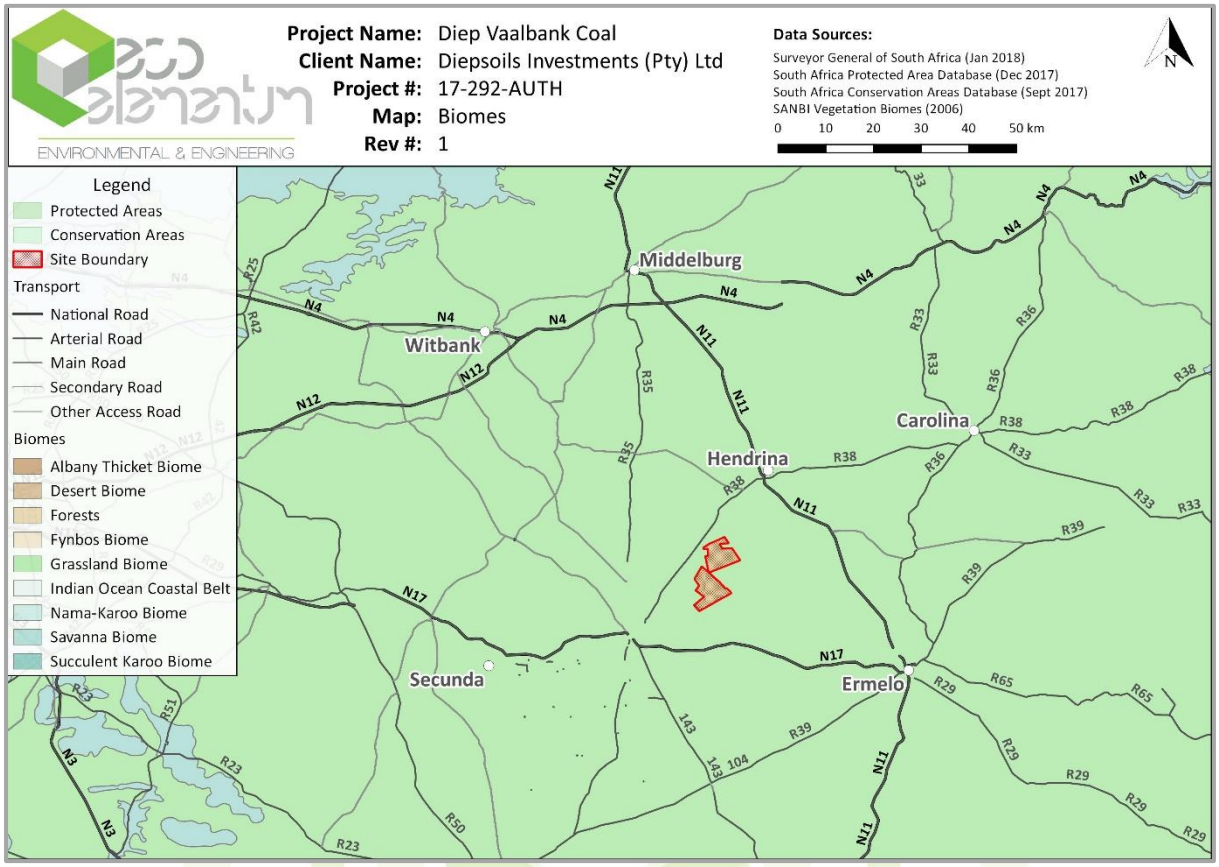


Figure 38: Vegetation Type

10.2.6.1 Mpumalanga Biodiversity Conservation Plan (MBCP).

The site mainly falls within the Eastern Highveld Grassland (Gm 12) vegetation type of the Grassland, which conservation status is **Vulnerable** according to the Mpumalanga Biodiversity Sector Plan (MBSP) (Lotter, M.C., Cadman, M.J. and Lechmere-Oertel, R.G., 2014) as well as in the National List of Threatened Ecosystems (SANBI & DEAT, 2011), and **Endangered** according to Mucina & Rutherford (2006). Only a very small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and in private reserves (Holkranse, Kransbank, Morgenstond).

The MBCP identifies both terrestrial and freshwater priority areas in terms of reaching biodiversity targets. Part of a wetlands can be seen on portions of the farm Kalabasfontein 232 IS and is listed as Eastern Temperate Freshwater Wetlands (**Alternative 1)**

According to the Mpumalanga Biodiversity Conservation Plan (MBCP) map (Ferrar, Tony A & Lötter Mervyn C, 2007) the conservation status of the proposed site varies from heavily modified to CBA Irreplaceable. However, at the proposed mining site, the conservation status varies from **Moderately Modified (Old lands) to Heavily Modified**. **(**Error! Reference source not found.). Several Critical Biodiversity Areas were s identified on site) on the terrestrial map and some Ecological Support areas, Mpumalanga Highveld Wetlands and National Wetlands (NFEPA) were found within the site on the freshwater CBA map (Figure 30). The IBA map shows the area is unprotected. Figure 41 and Figure 42 shows the sensitive areas which need to be avoided, including the river, IBAs and CBAs. **The proposed mining site should be placed in areas considered as Heavily Modified and all CBA and ESO areas should be avoided for both the terrestrial and freshwater categories.**

Figure 39:Mpumalanga Biodiversity Sector Plan Map for the proposed site, showing the terrestrial Critical Biodiversity Areas on and near the site

10.2.6.2 Eastern Highveld Grassland (Gm 12)

The largest part of the site occurs within the Eastern Highveld Grassland vegetation type. The vegetation type occurs on slightly to moderately undulating plains, including some low hills and pan depressions, in Mpumalanga and Gauteng Provinces. It occurs on the plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief mainly at an altitude of between 1 520–1 780 m, but also as low as 1 300 m.

The vegetation is short dense grassland dominated by the usual Highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Senegalia* (*Acacia) caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and Searsia *(Rhus) magalismontanum*).

10.2.6.3 Eastern Freshwater Wetlands (AZf 3)

This vegetation type occurs around water bodies with stagnant water (lakes, pans, periodically flooded wetlands, edges of calmly flowing rivers) and is embedded within the Grassland Biome. Altitude ranging from 750–2 000 m, on flat landscapes or shallow depressions filled with (temporary) water bodies supporting zoned systems of aquatic and hygrophilous vegetation of temporarily flooded grasslands and ephemeral herb-lands.

10.2.6.4 Alien, invasive plants and noxious weeds

Alien and invasive plants are opportunistic plants that invade disturbed areas, thus competing and replacing endemic plants. They have the potential to degrade the area and make it more susceptible to fire as their fuel content is high and they use more

water than indigenous plant species. No serious alien invasions are reported in the grassland vegetation types, but *Acacia mearnsii* can become dominant in disturbed sites.

The following aliens are encountered in the Eastern Temperate Freshwater Wetland Vegetation type: *Bidens bidentata*, *Cirsium vulgare*, *Conyza bonariensis*, *Oenothera rosea*, *Physalis viscosa*, *Plantago lanceolata*, *Rumex crispus*, *Sesbania punicea*, *Schkuhria pinnata*, *Stenotaphrum secundatum* (native on South African coast, alien on highveld), *Trifolium pratense*, *Verbena bonariensis*, *V. brasiliensis*, *Xanthium strumarium*, etc.

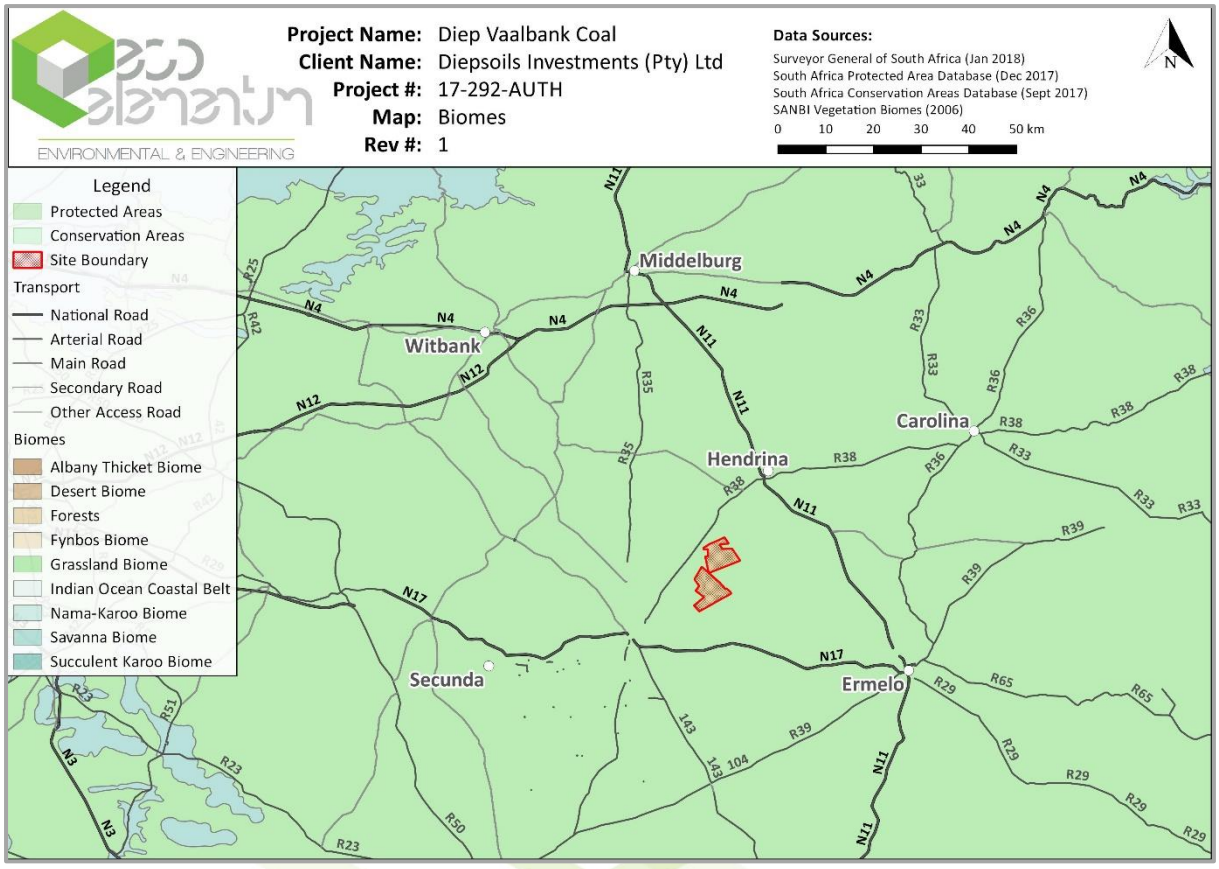


Figure 40: Relevant Biomes

Photo 7: Aerial view of proposed site (Alternative 1). Note the dark green line running across the photo - this is a stream.

Photo 8: Grassland with Eucalyptus forest in a northerly direction (Alternative 1)

Photo 9:Grassland with Eucalyptus forest (Alternative 1)

Photo 10: Facing East over the proposed Alternative 1

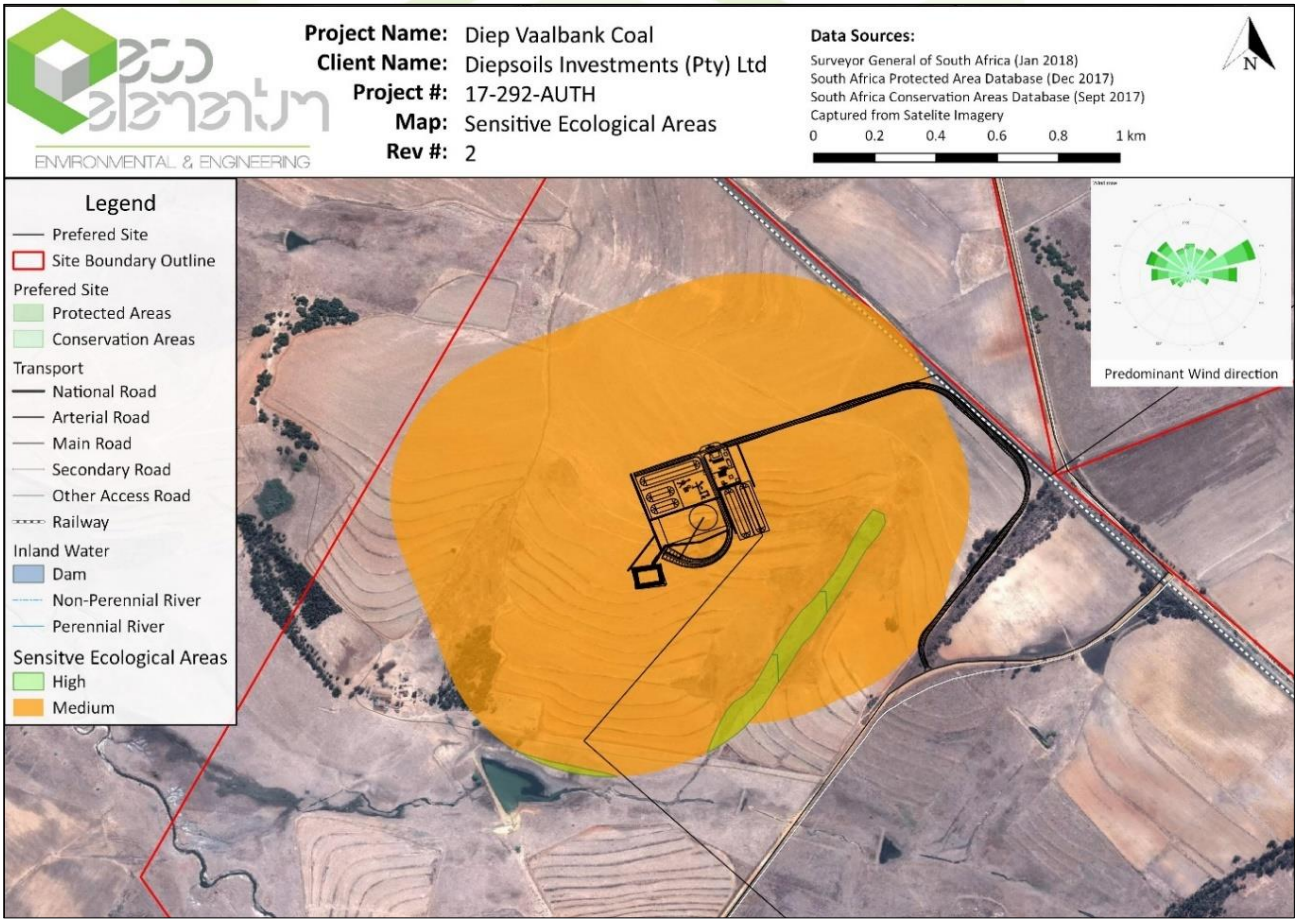


Figure 41: Regional Ecological Site Sensitivity

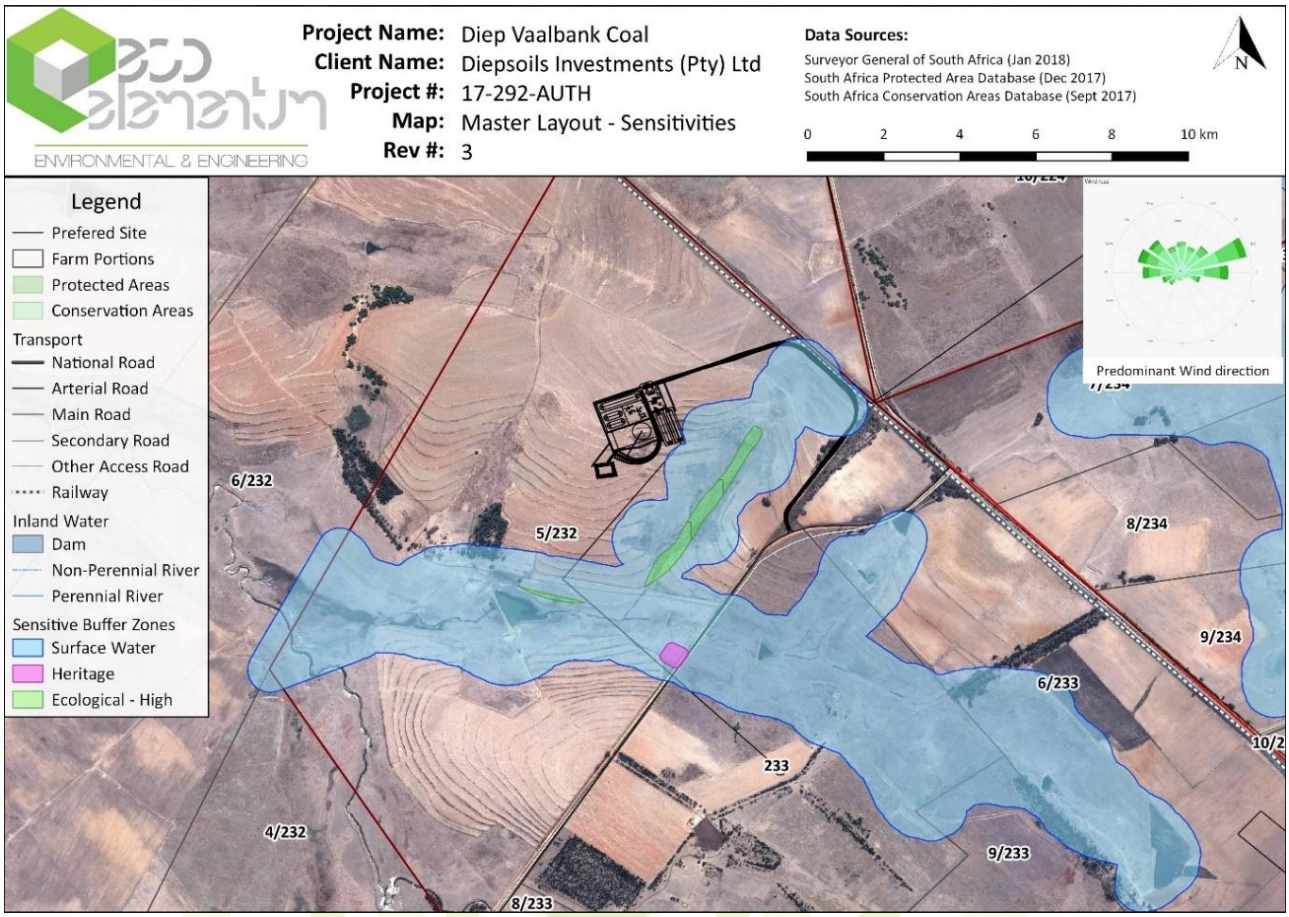


Figure 42: Overall Site Sensitivity including wetland buffers

10.2.6.5 Vegetation Impacts

- 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
- 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.

10.2.7 Fauna and Avifaunal

Methodology and Data Sources

- Ecological Investigation (Ecoelementum, 2018)

An animal desktop study was conducted to identify and list all mammals that could occur in the area, using the textbook such as the Red Data Book of the Mammals of South Africa: A Conservation Assessment (Friedmann Y & Daly B (editors), 2004), and The Mammals of the Southern African Sub-region (Skinner JD & Chimimba CT, 2005) and Skinner & Smithers (1990). Various distribution maps, textbooks and relevant literature such as previous Ecological studies and the Virtual Museum (Animal Demography Unit, 2016) were used to determine which birds, reptiles and amphibians occur in the area. A bird desktop study was conducted using Roberts' Multimedia of Birds of Southern Africa (Roberts, 2003) and (Southern African Bird Atlas Project 2, 2016). According to the latest regional red data listing published in 2013, 91 (11%) of South Africa's 845 bird species are listed as Threatened and another 54 species are listed as Near-Threatened. Nine species are listed as Critically Endangered.

Unlike flora, fauna are mobile and additional surveys, including nocturnal visits and camera trapping, would result in the confirmation of additional species. The close proximity of agricultural, forestry and mining activities near the site has resulted in a significant decline in larger mammals and birds in the general area. 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.

10.2.7.1 Faunal Impacts

Refer to section under "Vegetation Impacts"

10.2.8 Heritage and Archaeological Resources

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)

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 following observations are relevant:

- 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 180 m 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.

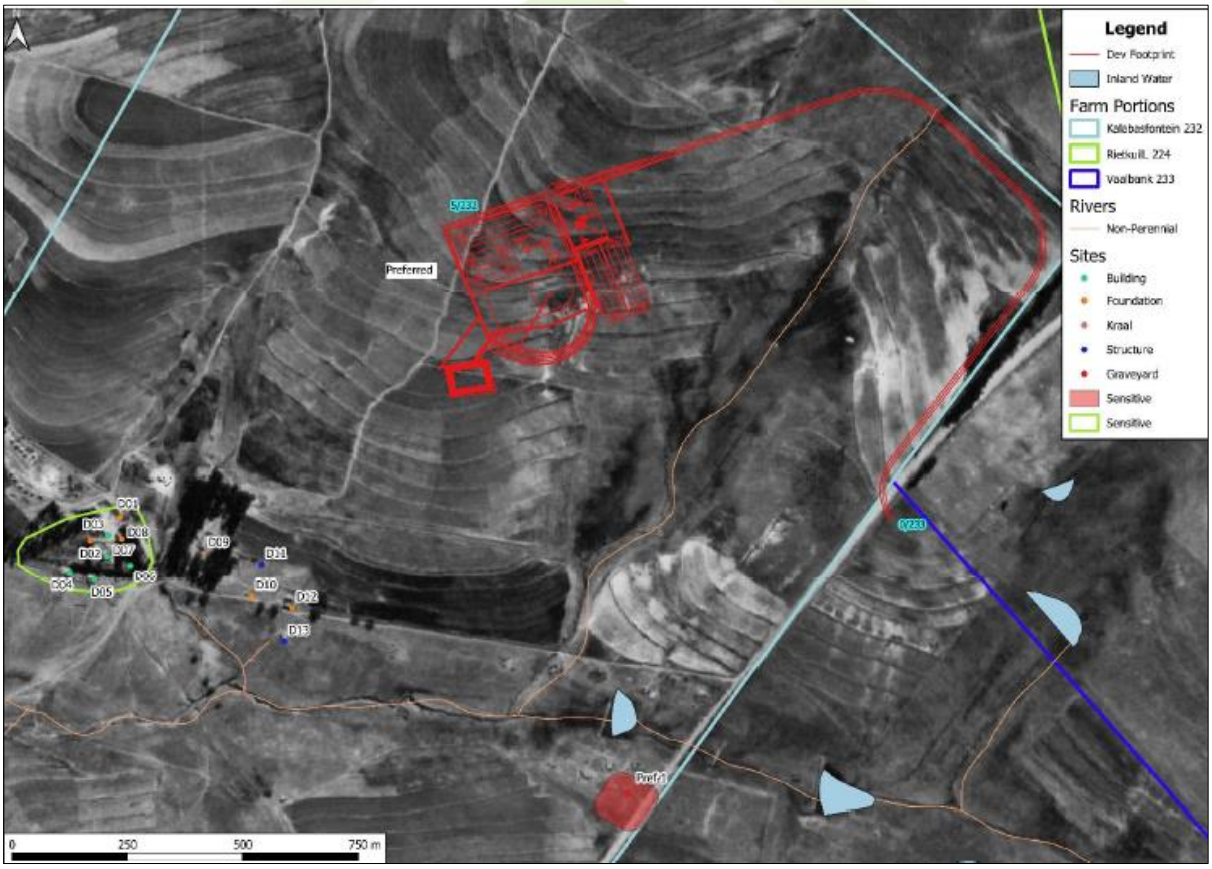


Photo 11: Heritage Observations imposed on a 1968 Aerial Photograph

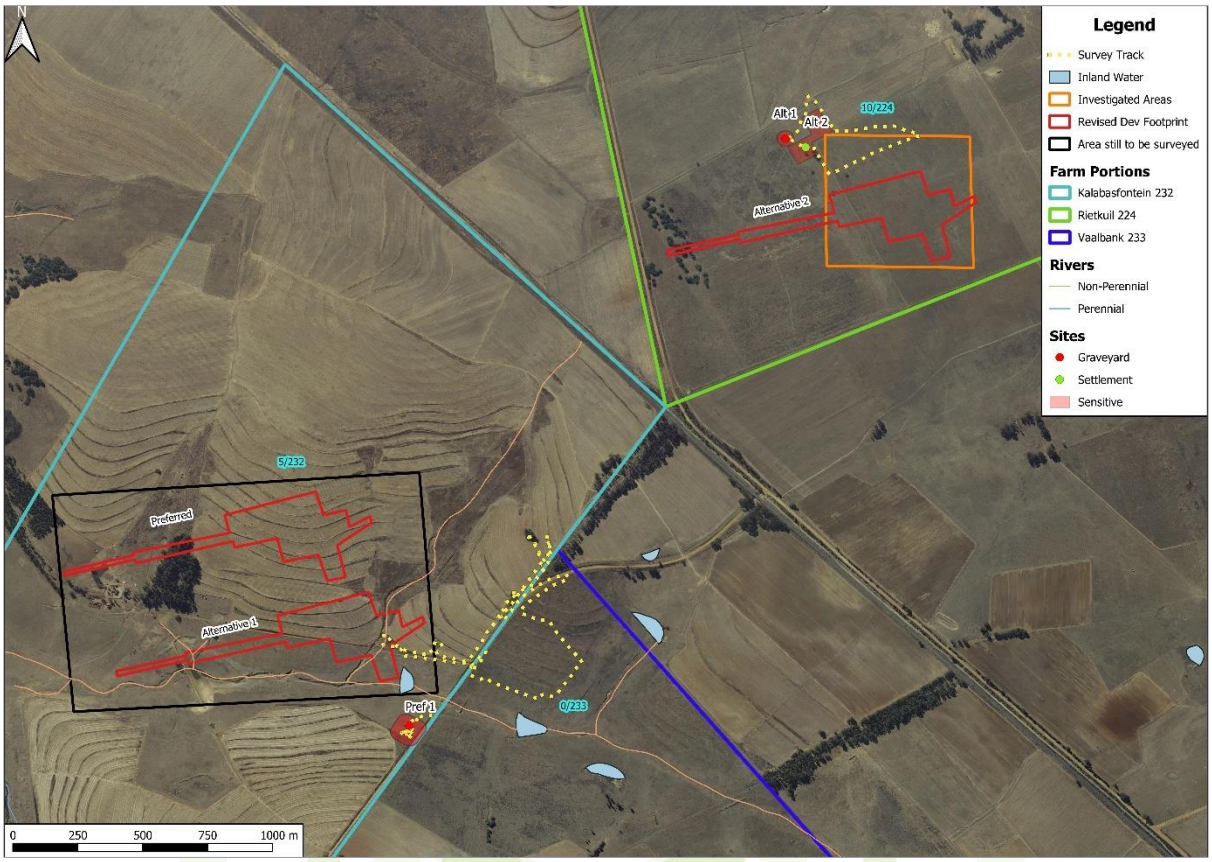


Figure 43: Heritage sites within the site boundary

Photo 12: D02 Foundation Remains

Photo 13: DO5 Historical Building

Photo 14: DO7 Historical Building

Photo 15: D09 Kraal

Photo 16: Graveyard at Alternative 2

10.2.8.1 Heritage Impacts

All construction and operational activities of the mine throughout the LOM

10.2.9 Paleontological Resources

- **Data Source and Methodology**

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

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 (Annexure 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).

10.2.9.1 Paleontological Impacts

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.

10.2.10 Noise, Blasting and Vibration

Methodology and Data Sources

- Blast Impact Assessment (Blast Management & Consulting, 2018)
- Noise Impact Assessment (Ecoelementum (Pty) Ltd, 2018)

10.2.10.1 Noise

Various noise influencing factors and sources exists in the region including;

- A railway line passing on the boundary of the site.
- General vehicle noise on auxiliary roads in close proximity to the site
- Agricultural activities resulting in noise (mostly related to farming vehicles and machinery noise although very little)

Three (3) mining areas were identified to the north-west of the proposed operations as can be seen in Figure 3. A lot of informal farm houses can be found within the immediate vicinity of the proposed construction area of the underground shaft as can be seen in 4. The human habitation is found around the proposed operations in all wind directions. Only the closest houses are

shown on the map. The area is a predominant agriculture community, all agriculture fields and open water sources were not marked on the map. Ambient sound level measurements were undertaken at various positions on the site and at surrounding offsite locations. Noise measurements were taken on the 26th of March 2018 during the daytime and night-time respectively, with daytime commencing at 06:00 and ending at 22:00 and night-time commencing at 22:00 and ending at 06:00 as prescribed in *SANS 10103:2008 - The measurement and rating of environmental noise with respect to annoyance and to speech communication*.

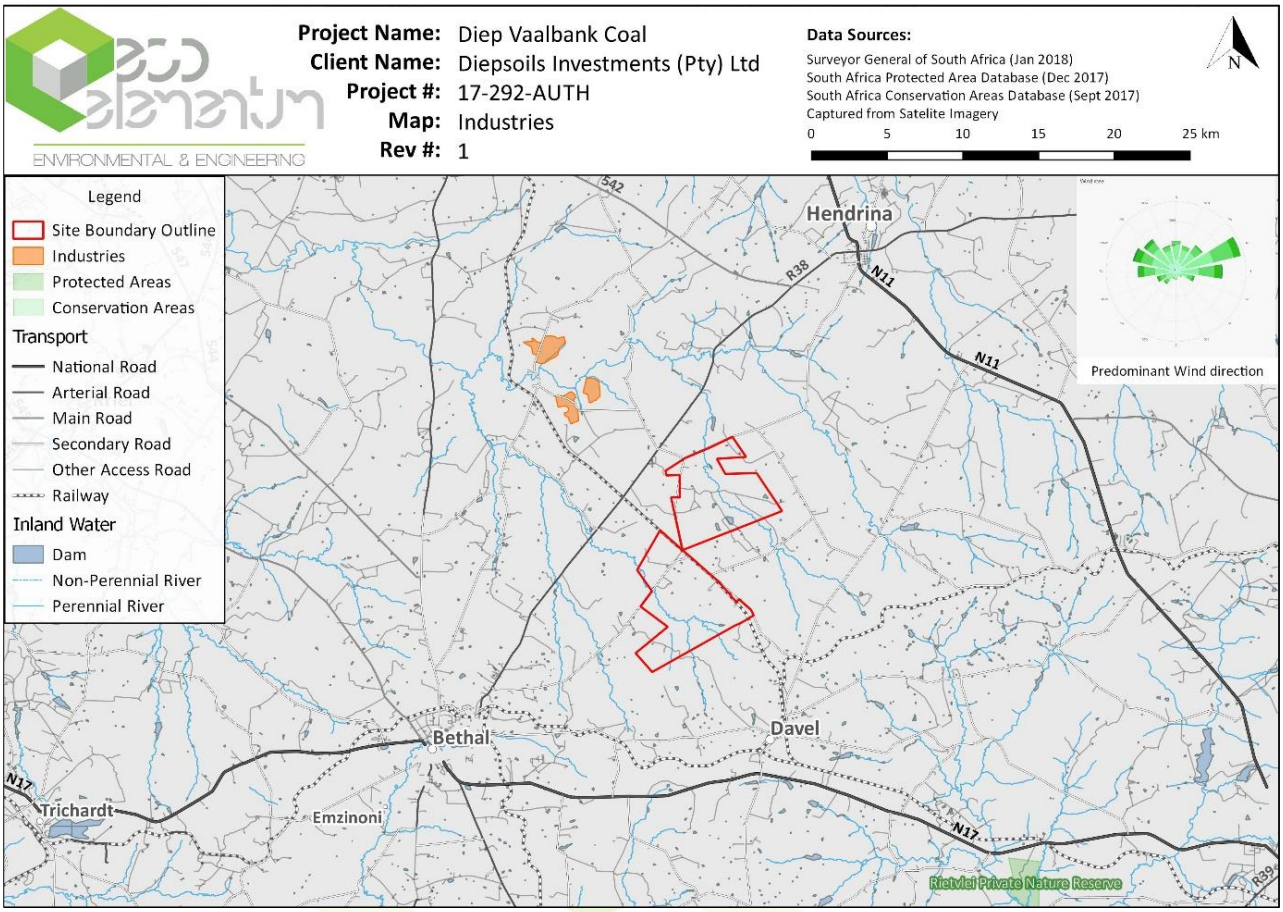


Figure 44: Industries close to the site

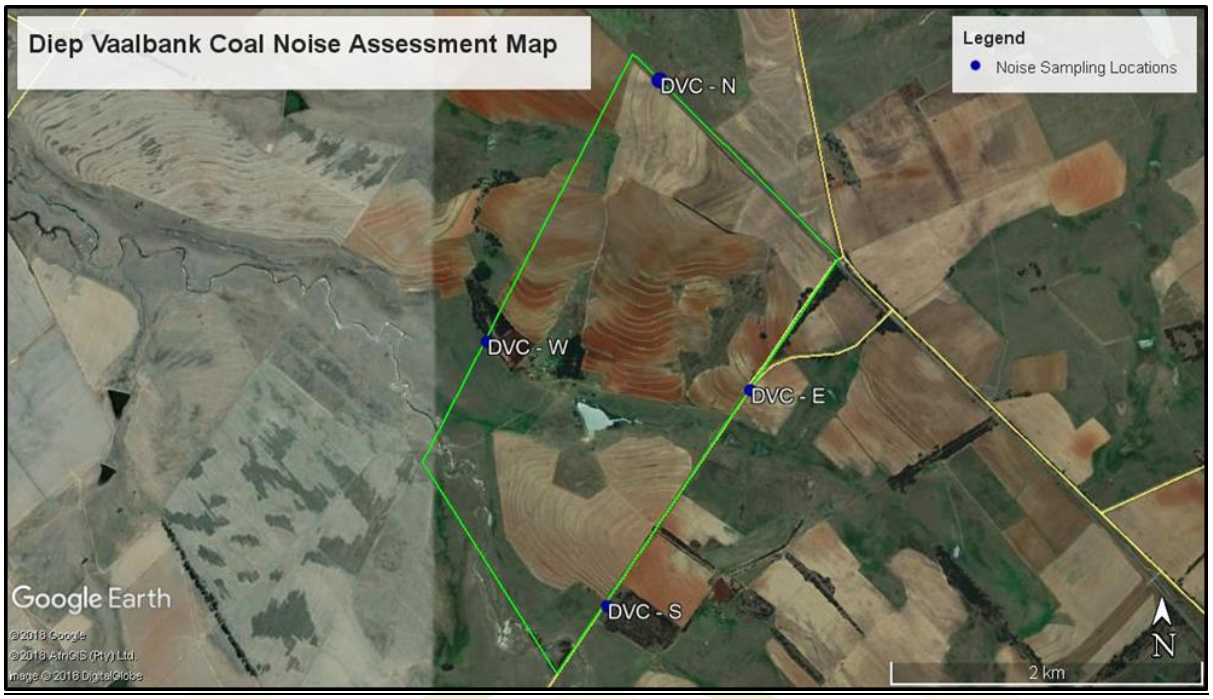


Photo 17: Noise Measurement Locations

Table 22: Noise Assessment Results

Ref	Locality	Day/Night	Acceptable rating level dB(A)	Results L_{Aeq}	Results L_{max}	Results L_{min}	Time	Observations
DVC - N	Northern Boundary	Day	45	52.6	54.1	52.5	16:23	
		Night	35	47.2	52.3	47.1	04:55	
DVC - E	Eastern Boundary	Day	45	52.9	54.2	52.4	16:46	
		Night	35	47.6	52.1	47.4	05:12	
DVC - S	Southern Boundary	Day	45	52.7	54.7	52.3	16:15	
		Night	35	47.5	52.3	47.2	05:20	
DVC - W	Western Boundary	Day	45	52.6	54.4	52.3	16:35	
		Night	35	47.4	51.9	47.1	05:34	

Based on the day and night-time results from the baseline environmental noise measurements it is noted that the LAeq levels at day and night at all the locations measured above the SANS guidelines for the maximum allowable outdoor parameters for ambient noise in rural districts. The rating levels of 45LAeq for daytime and 35LAeq night-time for outdoor rural areas were used for the comparison.

Table 23:Anticipated noise source

Anticipated noise source	Expected noise level at source measured in dBA
Front end loaders	+- 95
Dozers	+- 95
Haul trucks	+- 90

Blasting	+- 130

10.2.10.2 Blasting and Vibration

- The project area has people and houses at ranging distances to the project area. There are 35 points of interest identified surrounding the project area. Specific attention will need to be given to these. The nearest house / farmstead is found 99 m away from the nearest possible box-cut area. The underground blasting is expected to occur on average depth of 81 m.
- There is on group of structures at POI 9 that is of concern. These structures are closest to Option 1 box-cut. The ground vibration levels predicted is higher than safe blasting criteria and will require attentions in the final design phase. The rest of the POI's identified are relative far from any of the three box-cuts. The possible influence at these POI's are low.

Table 24: POI Description Used

Class	Description
1	Rural Building and structures of poor construction
2	Private Houses and people sensitive areas
3	Office and High-rise buildings
4	Animal related installations and animal sensitive areas
5	Industrial buildings and installations
6	Earth like structures – no surface structure
7	Graves & Heritage
8	Water Borehole

- Underground blasting operations are relatively deep with low levels of possible influence on surface. Vibrations may be felt but levels are well below any probable damage causing levels.
- There are also regulations that will need to be followed for permission to conduct blasting operations with these installations within 500 m from the blast operations.
- Air blast predicted for the maximum charge ranged up to 132.5 dB for all the POI's considered. These levels may contribute to effects such as rattling of roofs or door or windows and is expected not to be damaging. Levels may cause people to complain. Damages are only expected to occur at levels greater than 134dB.

Table 25: Anticipated noise source

Level	Description
>130 dB	Resonant response of large surfaces (roofs, ceilings). Complaints start.
150 dB	Some windows break
170 dB	Most windows break
180 dB	Structural Damage

Underground coal blasting consists of blastholes drilled into the face. A maximum of 800gr of explosive can be charged in a blasthole for underground coal mines in South Africa. The arrangement of blastholes drilled could typically be as shown in figure 6. The two rows of blastholes are initiated simultaneously yielding a total mass of explosives detonating at 3.2 kg. Due to the fact that blasting is done underground the ground vibration levels are reduced by up to 50% than that expected.

Table 26: List of points of interest identified

Tag	Description	Classification	Y	X	Specific Limit (mm/s)

1	Railway Substation	5	-63932.7779	2917090.762	12.5
2	Farm Stead	2	-62162.2426	2912536.028	12.5
3	Structure	2	-62269.3564	2912666.21	12.5
4	Pan	6	-61903.5372	2912399.847	200
5	Structure	2	-58973.8625	2912006.891	12.5
6	Railway	5	-60948.6978	2914053.408	150
7	Railway Bridge	5	-61442.3267	2914574.099	50
8	Dam	6	-58879.1184	2913452.838	200
9	Various Structures	2	-59223.4484	2914925.889	12.5
10	Structure	2	-59493.5635	2916329.363	12.5
11	Dam	6	-60207.1437	2915290.177	150
12	Dam	6	-60421.4297	2915370.854	150
13	Dam	6	-60615.9094	2915436.618	150
14	Farm Stead	2	-60310.9855	2916285.51	12.5
15	Structures	2	-60331.5058	2916443.563	12.5
16	Structures	2	-60263.0143	2916474.502	12.5
17	Structures	2	-60517.199	2916309.17	12.5
18	Structures	2	-60327.778	2916395.439	12.5
19	Structure	2	-64197.7161	2917395.066	12.5
20	Farm Stead	2	-64051.6938	2917882.085	12.5
21	Farm Stead	2	-59961.519	2920953.089	12.5
22	Farm Stead	2	-60875.0148	2911996.232	12.5
23	Farm Stead	2	-61870.8069	2910055.149	12.5
24	Farm Stead	2	-61597.4231	2908821.587	12.5
25	Structures	2	-61068.0684	2909307.084	12.5
26	Farm Stead	2	-61859.9319	2908042.655	12.5
27	Houses	2	-61836.255	2908362.753	12.5
28	Pan	6	-62233.5708	2909887.996	200
29	Farm Stead	2	-64685.7069	2908079.868	12.5
30	Dam	6	-64531.4183	2907883.116	200
31	Farm Stead	2	-64660.8293	2908260.917	12.5
32	Farm Stead	2	-62007.2689	2911434.413	12.5
33	Cement Dam	5	-61326.4897	2919570.476	50
34	Dam	6	-63299.5596	2919156.893	150
35	Dam	6	-60459.9968	2919979.241	150

10.2.10.3 Fly Rock Unsafe Zone

The occurrence of fly rock in any form will have impact if found to travel outside the safe boundary. If a road or structure or people or animals are within the safe boundary of a blast, irrespective of the possibility of fly rock or not, precautions should be taken to stop the traffic, remove people or animals for the period of the blast. The fact is that fly rock will cause damage to the road, vehicles or even death to people or animals. This safe boundary is determined by the appointed blaster or as per mine code of practice

Fly rock can be categorised as follows:

- **Throw** - the planned forward movement of rock fragments that form the muck pile within the blast zone.
- **Fly rock -** the undesired propulsion of rock fragments through the air or along the ground beyond the blast zone by the force of the explosion that is contained within the blast clearance (exclusion) zone. When using this definition, fly rock, while undesirable, is only a safety hazard if a breach of the blast clearance (exclusion) zone occurs.
- **Wild fly rock** - the unexpected propulsion of rock fragments that travels beyond the blast clearance (exclusion) zone when there is some abnormality in a blast or a rock mass.

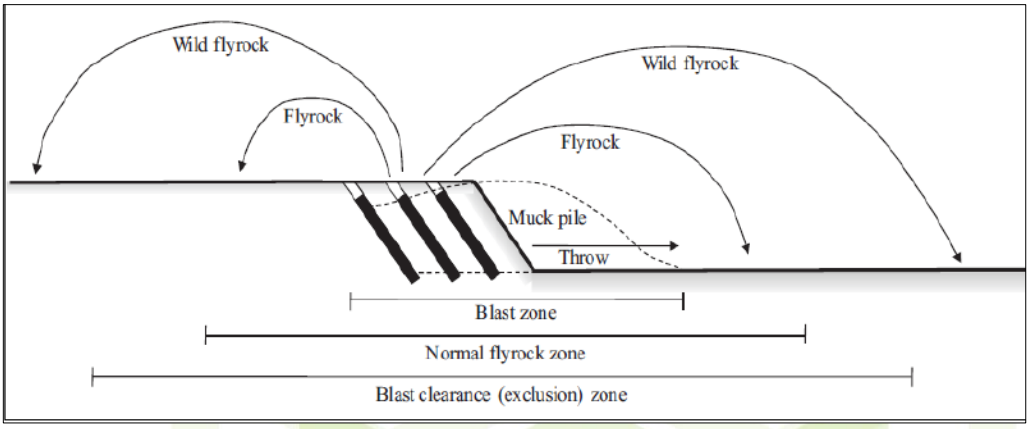


Figure 45: Fly Rock Description

Table 27: Fly rock concern POI's

Tag	Description	Y	X	Distance (m)
9	Various Structures	-59223.4484	2914925.889	99

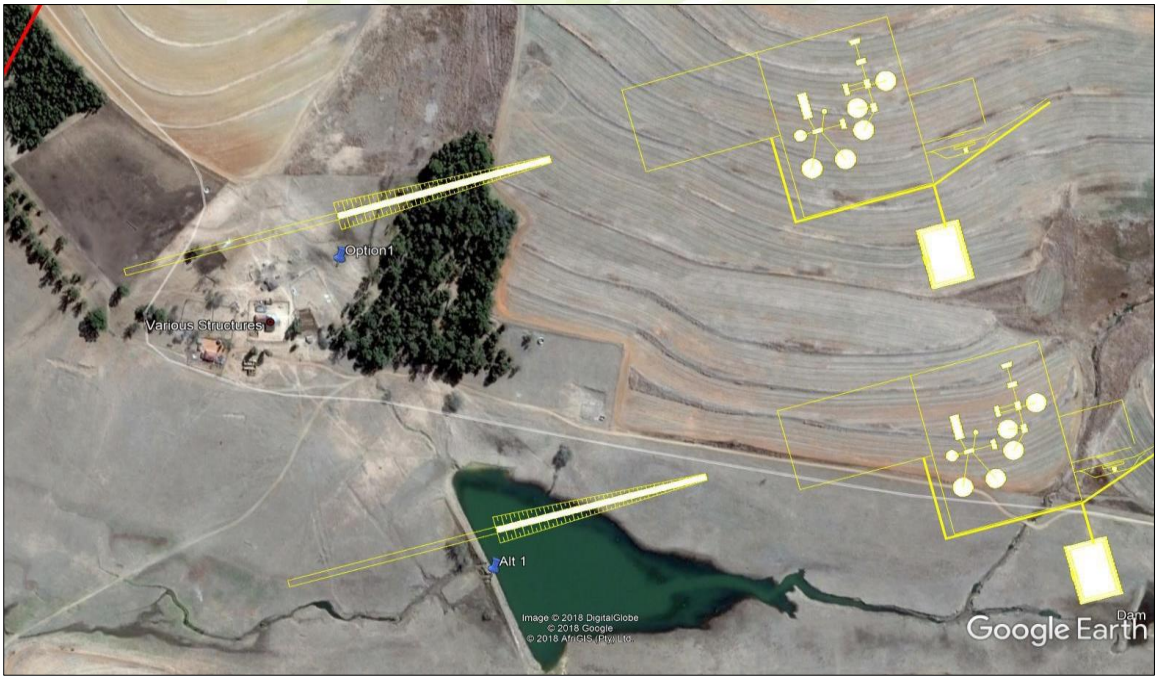


Photo 18: Ground vibration where mitigation is required *(Alternative 1 layout has shifted further north subsequent to this map)*

10.2.10.4 Noise and Vibration Impact Sources

- Noise pollution and vibration impacts experiences by sensitive receptors, including:
    - Rattling of roofs or door or windows (blasting events)
    - Farm workers living on the respective sites;
    - Households located adjacent to the respective sites; and
    - Households located along transportation routes.
- Negative Impact on surrounding land users and the local community Health, Safety and security concerns experienced by surrounding land users and the local community.

Figure 46: Sensitive Receptors (POI) for Blast and Vibration

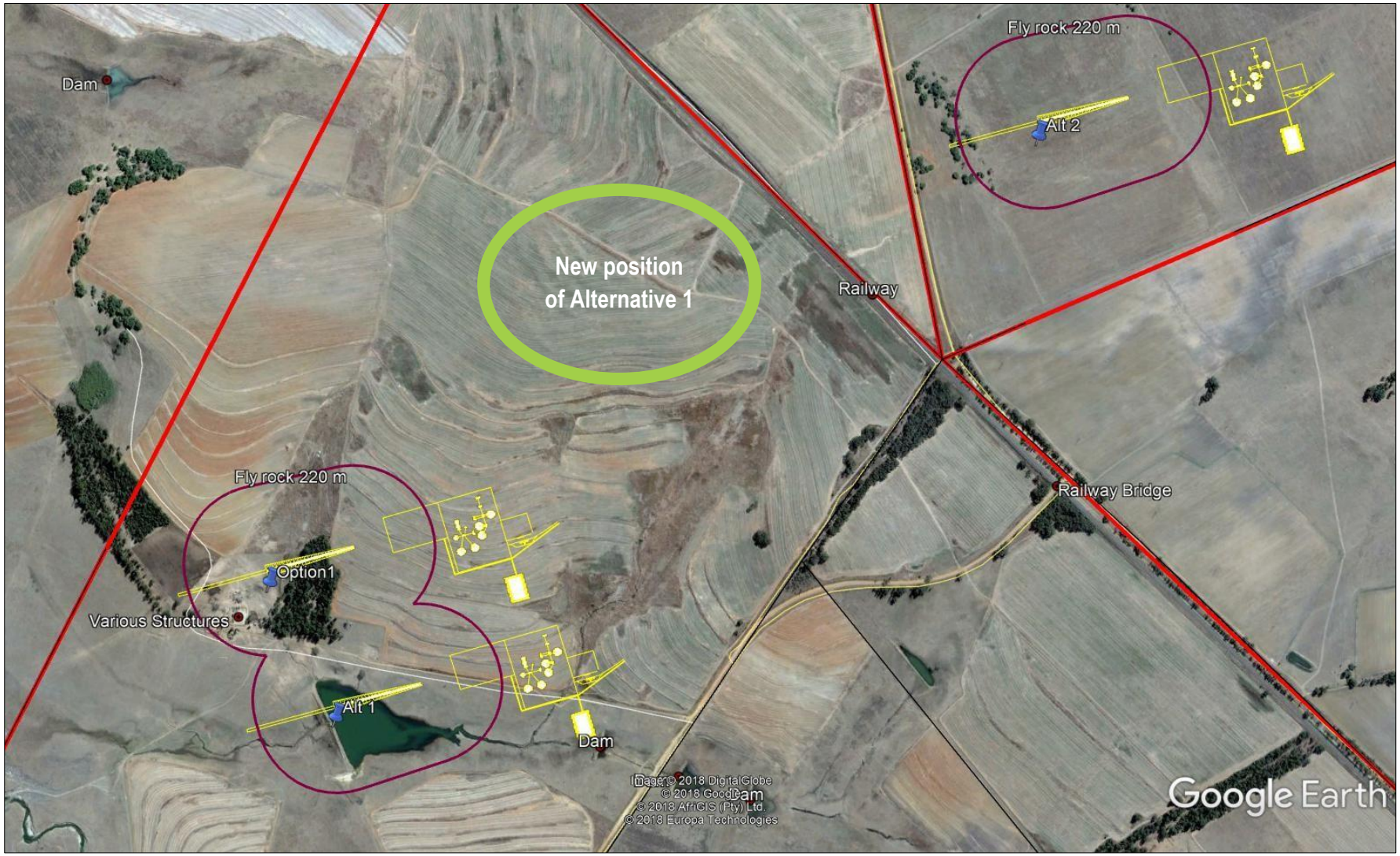


Figure 47: Predicted Fly Rock Exclusion Zone *(Alternative 1 layout has shifted further north subsequent to this map)*

10.2.11 Transport

Methodology and Data Sources

- Mining Works Programme (Nurizon, 2018)
- Msukaligwa IDP 2017-2022

- 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)

- 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. The number of trucks that will be added to the existing road network will peak in year 4. This will be approximately 28 trucks per night and day shift respectively, translating to one interlink every 26 minutes.

- The existing road infrastructure is well developed in the area and thus well connected to surrounding major centres via regional routes. The combination of national roads and first and second order roads provides good inter- and intra-regional accessibility.

- The mine access road was designed as a 9m wide gravel road with a design speed of 60km/h. All the horizontal curves are larger than the required 110m with super elevation introduced on the curves. The K-values for the vertical alignment are all larger than the required 16 for crest and sag curves with a minimum curve length of 100m used. The road follows the existing farm roads to the north next to the Trasnet railroad reserve (which runs between Halfgewonnen – west and Webruss towards the south east) and farm road on the south eastern side. The route was chosen to reduce the footprint as far as possible within the 1 in 100 flood line area. The tie-in with the existing gravel road is shown in Figure 20. The traffic will then follow the existing gravel road towards the north where it will access the R38.

- The intersection with the existing gravel road is located on the outside of the existing horizontal curve which allows for the required sight distances. The intersection has bell mouths with a radius of 12m that will allow for the design vehicles turning movements. The levels of the access road were designed in such a way that the intersection does not require and adjustment to the existing gravel road's alignment or levels.

10.2.11.1 Traffic Impact Sources

- 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.

10.2.12 Visual

- **Methodology and Data Sources**

Diep Vaalbank Coal Visual Impact Report (Eco Elementum, 2018).

10.2.13 Visual Setting

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)**.

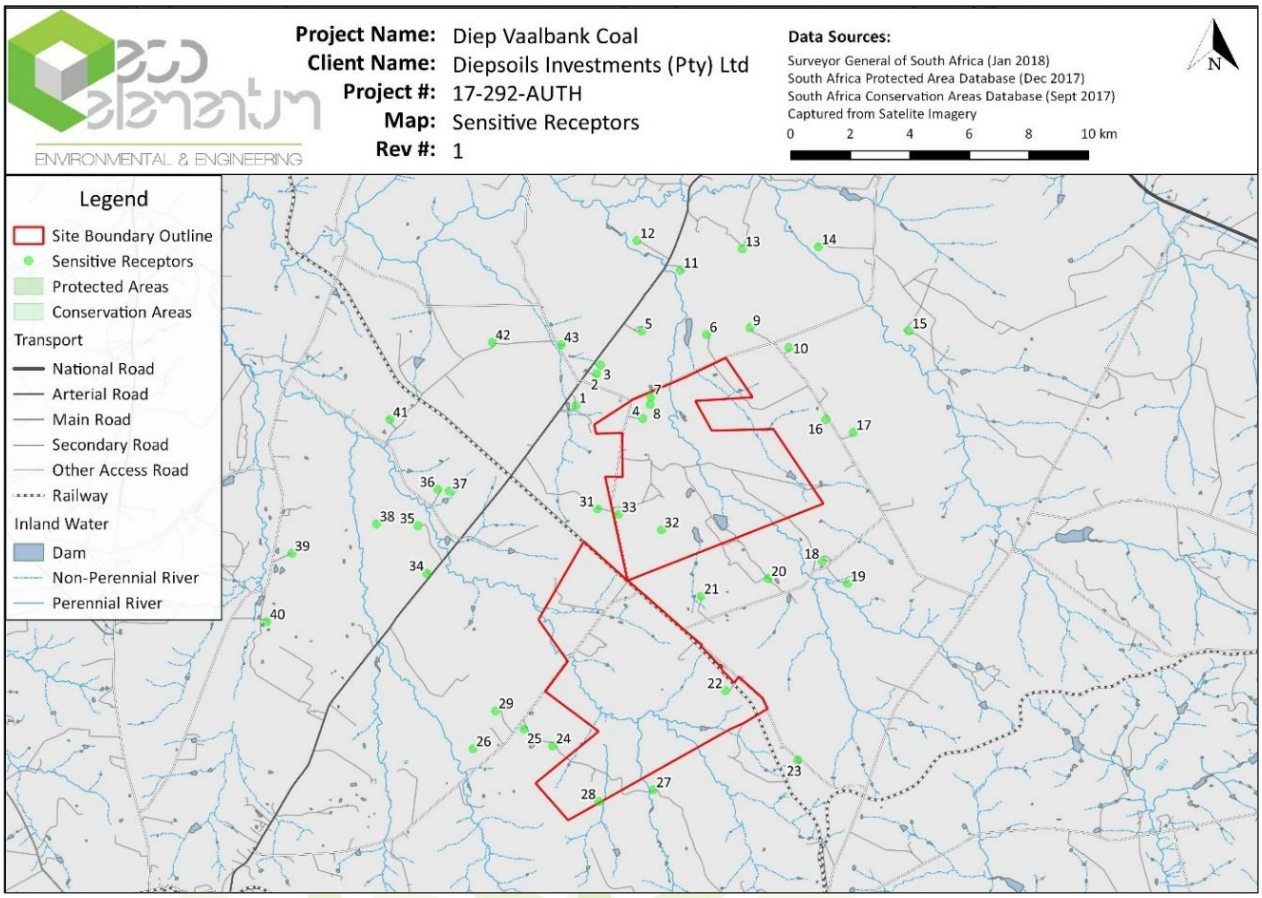


Figure 48: Sensitive Receptors

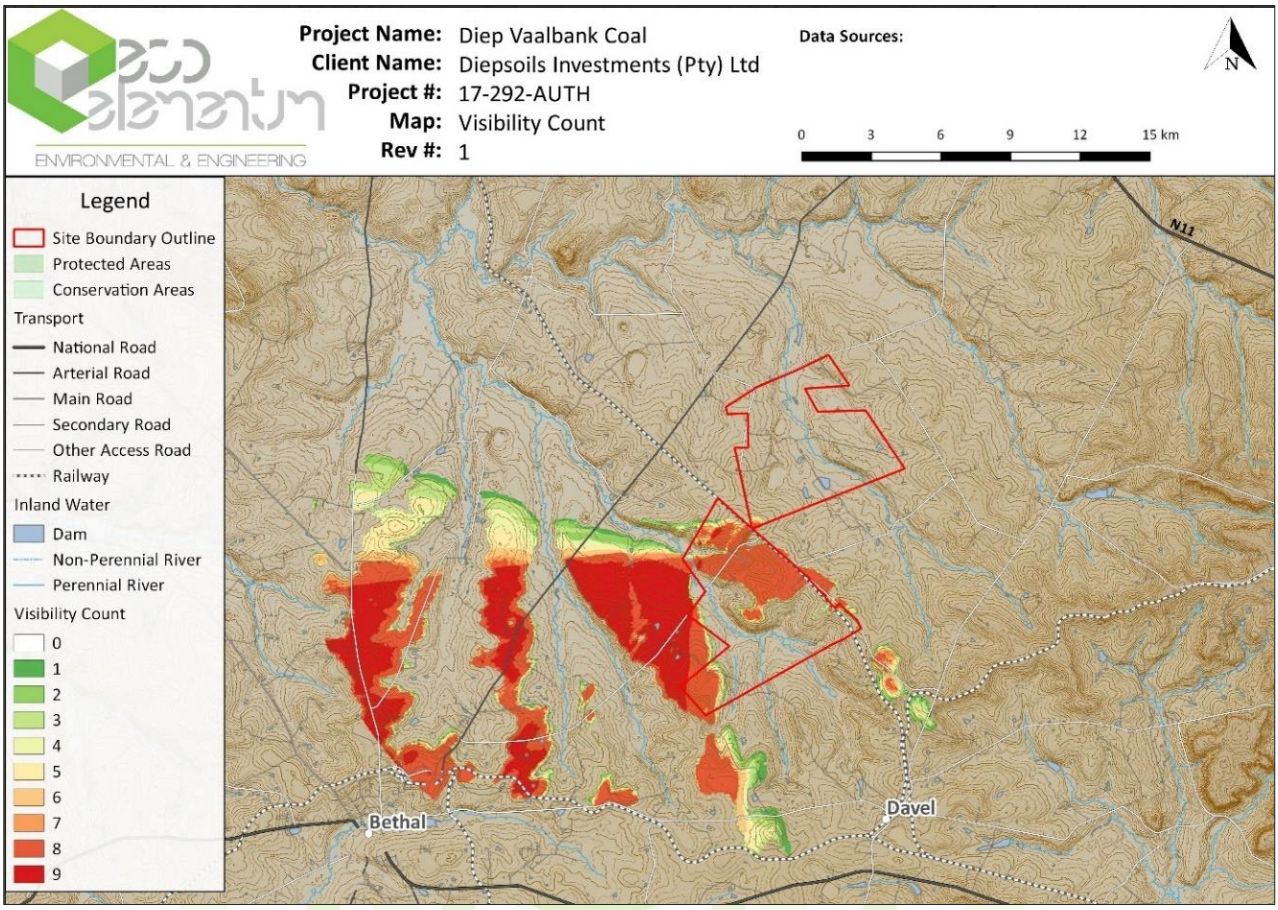


Figure 49: Viewshed of proposed Diep Vaalbank Coal project – Visibility Count

Table 28: 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

10.2.14 Visual Impact Source

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. The Visual Impact will be long term and will be relevant until the site has been rehabilitated post all mining activities.

10.2.15 Socio-Economics

Methodology and Data Sources

- Social Impact Assessment (2017)

- Census, 2011 (StatSA, 2018)
- Integrated Development Plan for the Msukaligwa Local Municipality (2012-2013)

Mpumalanga Province

Mpumalanga province is the second smallest in size after Gauteng measuring 76 495 km^2 and covering 6.3% of the land area in the country. This current land area represents a decrease in the land area as the size recorded during census 2001 was 79 487 km^2. This decrease is attributed to the allocation of land to the City of Tshwane from the Victor Kanye (previously called Delmas) (Statistics SA, 2012).

Population Growth

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.

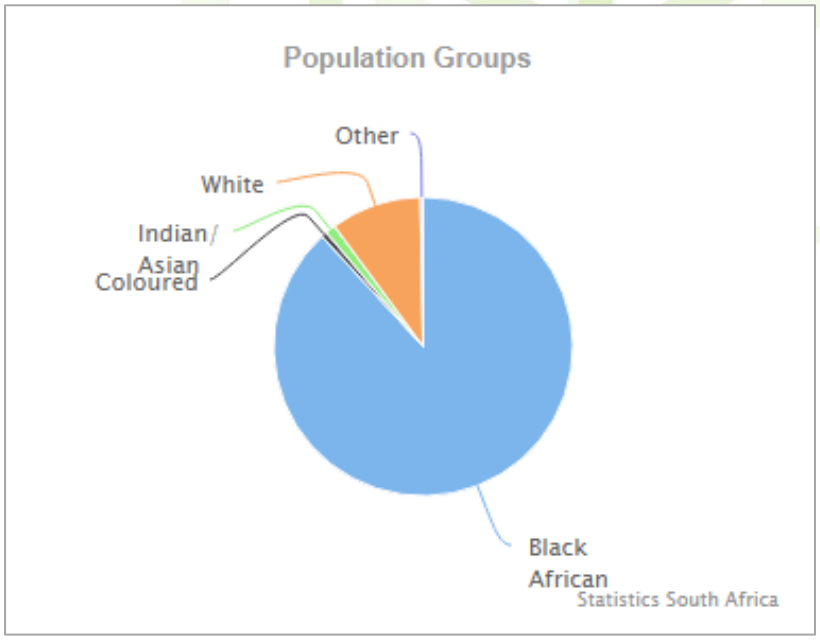


Figure 50: Population Groups

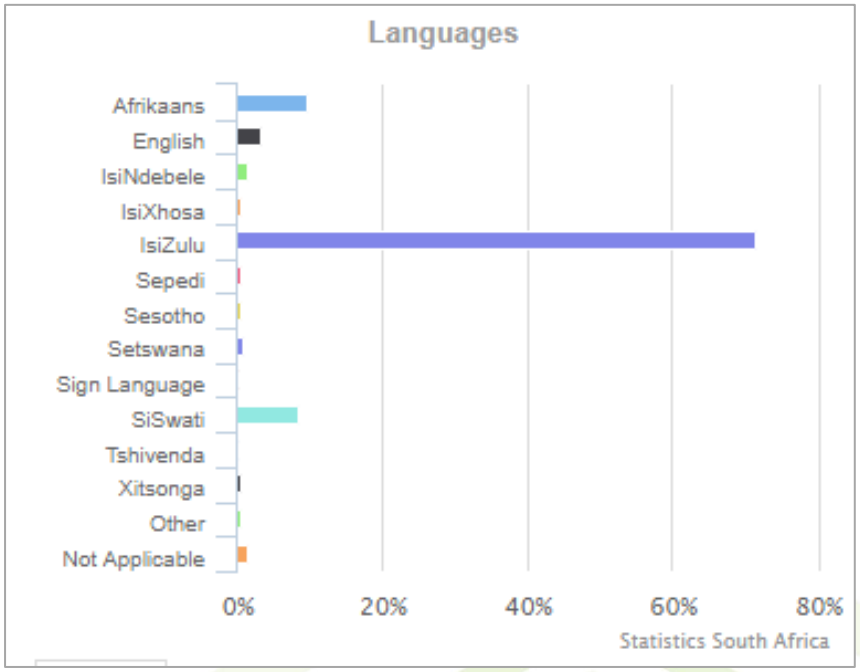


Figure 51: Languages

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.

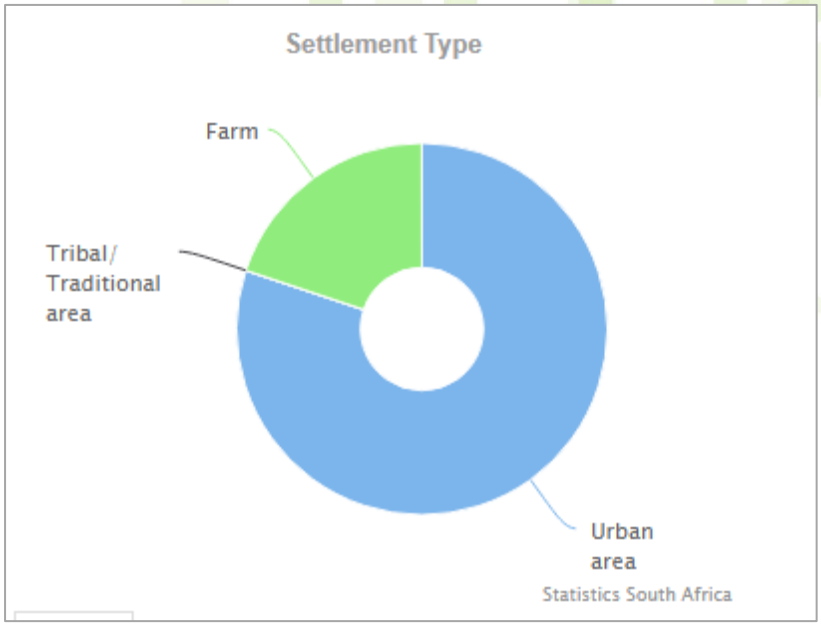


Figure 52: Settlement Types

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% (**Error! Reference source not found.**).

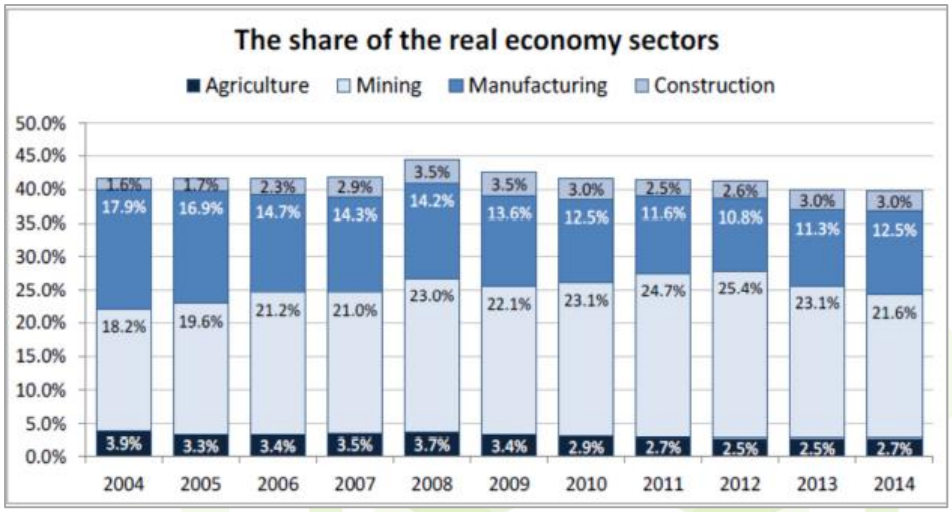


Figure 53: Mpumalanga GVA – 2014

Employment and Household Income

- 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.

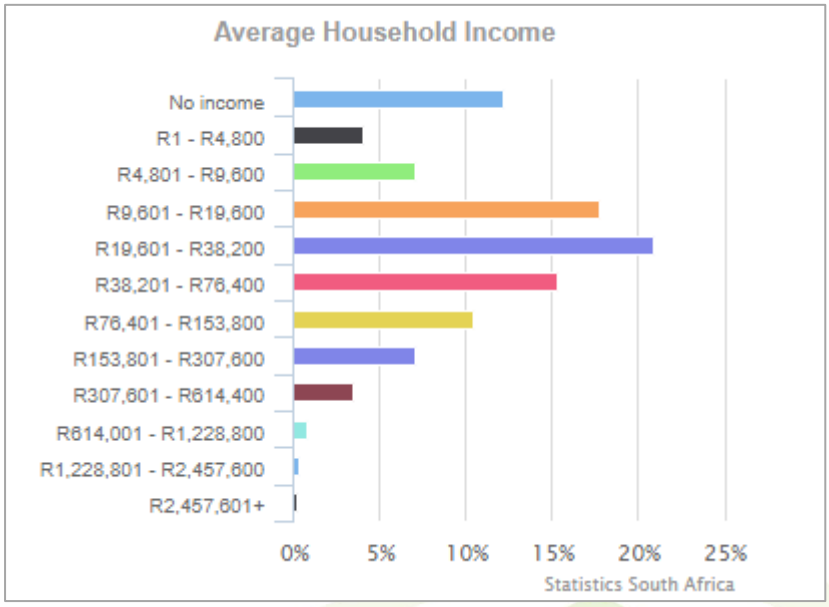


Figure 54: Average Household Income

10.2.15.1 Zikalala Household

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.

Photo 19: Zikalala household located on Kalabasfontein 232 IS

10.2.15.2 Agriculture Sector

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).

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.

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).**

10.2.15.3 Food security

Food security is an issue faced by both District municipalities. Due to the competition of land between mining and agricultural sectors, the prevalence of food security as a challenge has increased (Gert Sibande District Municipality, 2017; Nkangala District Municipality, 2017).

10.2.15.4 Mpumalanga's Tourism Sector

The Mpumalanga Tourism and Parks Agency had divided the Province into seven different tourism regions that are geographically diverse and offer tourists very different experiences. Significantly, the District hosts three of the seven regions, namely "Cosmos Country," "Grass and Wetlands," and the "Wild Frontier". Unfortunately, though, with the exception of the Wild Frontier towards Barberton which is currently rated as the second most popular area in the Province, the other two regions are currently ranked very low.

Tourism contribution in Mpumalanga is of strategic importance especially because it boosts provincial employment and GDP. In 2015, tourism's direct contribution towards GDP is estimated at R17.6 billion and the total contribution is estimated at R35.1 billion compared to national at R357 billion. The contribution is estimated at a percentage of 3.4 and 9.4 respectively during the same year. The sector also contributes significantly to employment in the province as well as the country.

There are four (4) main tourism clusters within the District:

- Around Secunda in Govern Mbeki (mostly accommodation, conference and entertainment/ casino;
- Around Wakkerstroom (wetlands, bird watching);
- Around Chrissiesmeer (wetlands, bird watching);
- Around the Grootdraai Dam near Standerton (water sports).

The site under investigation is however not linked to any major tourism attraction and not located on any of the main roads associated with tourism routes.

10.2.15.5 Mining Sector

The mining sector within Gert Sibande 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. Mining is an important economic activity within Nkangala. The mining sector is the largest sector within the NDM, contributing approximately 40.9% of the total Gross Value Add (GVA) (Nkangala District Municipality, 2017). Mining activities occur towards the southern regions of Nkangala, however, within the southern regions, crop farming especially maize and vegetables, is encouraged while cattle and game farming is encouraged in the northern regions (Nkangala District Municipality, 2017). Nkangala has significant mining potential which has the potential to contribute towards employment opportunities. This however, may result in sporadic urban settlement patterns and increased influx of labourers into the area resulting in mushrooming of informal settlements.

Steve Tshwete is situated centrally within Nkangala and consists of many industries and companies such as Columbus Steel, power stations, local mines and many strong agricultural areas. Steve Tshwete has one of the largest economies within Nkangala and is dominated by the mining sector following behind the manufacturing of steel (Nkangala District Municipality, 2017).

The mining sector within the Gert Sibande specifically within Govan Mbeki contributes largely towards Mpumalanga's GVA. Products that are mined in Gert Sibande are gold and coal. Gert Sibande contains four operational coal-fired power stations, situated within close proximity to the coal mines. Leading sectors within Gert Sibande include trade, community, mining and agriculture. Over the years, there has been a decrease in the role that the agricultural and trade sectors have played and the community and mining sectors have increased in terms of employment opportunities (Nkangala District Municipality, 2017).Similarly to Nkangala, the increase in mining activities attracts an influx of labourers, placing pressure on the receiving environment and resources.

10.2.15.6 Social Impact Zone

The Social Impact Zone (SIZ) should be considered as the primary social environment from where employment should be sourced. Households within a 20km radius of the site should be provided preference when implementing socio-economic policies and mitigation measures. The SIZ includes sections of the Nkangala and Gert Sibande District Municipalities, with the relevant local municipalities being Steve Tshwete, Govan Mbeki and Msukaligwa

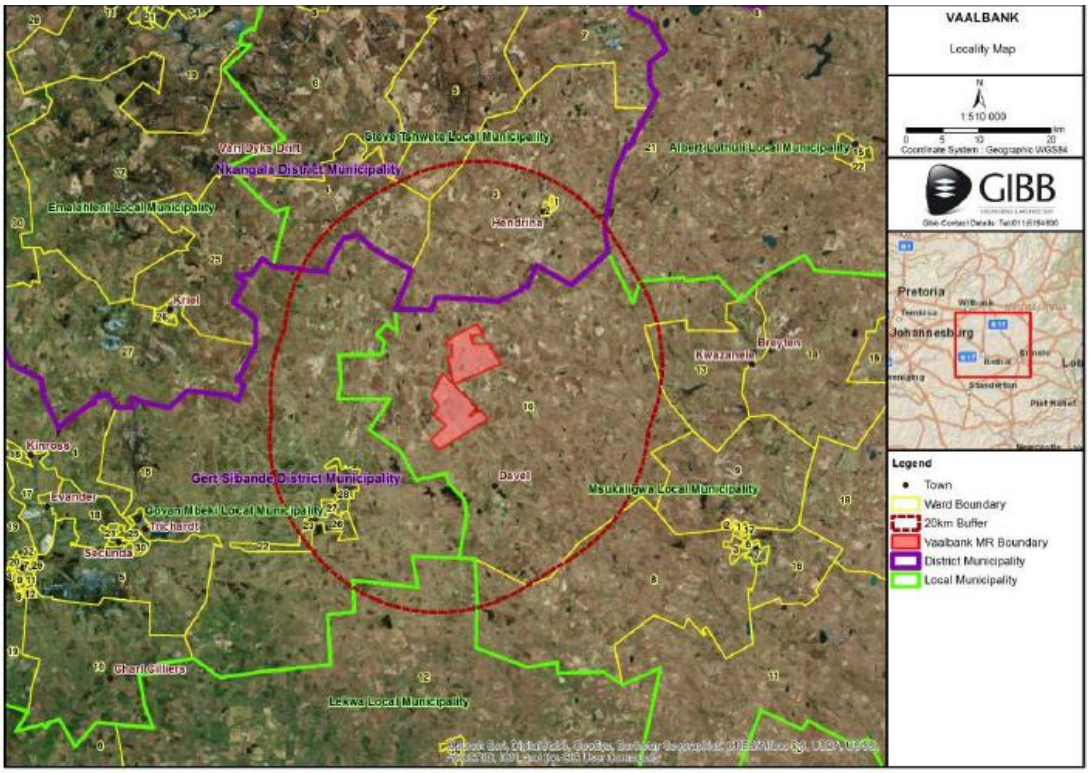


Figure 55: Social Impact Zone

10.2.16 SIZ Population

The SIZ's population consist predominantly out of African (81.32%) persons, followed by16.86% White persons as seen in Figure 56.The dominant home language for the SIZ is IsiZulu, which is spoken by around 47.80% of the population followed by Afrikaans at 15.93%.

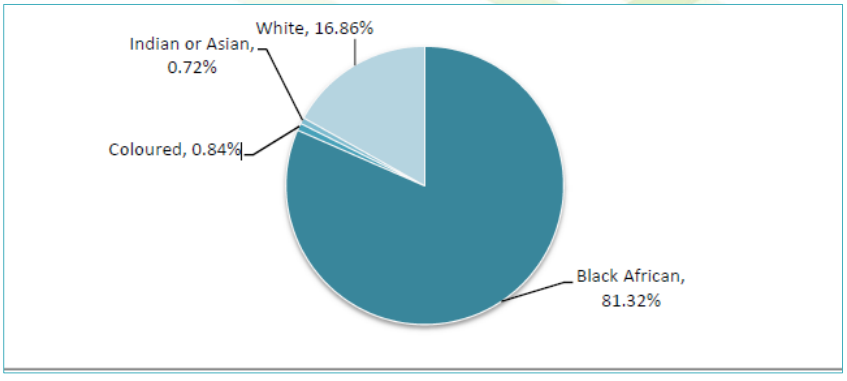


Figure 56: SIZ Population group (Stats SA, 2012)

10.2.17 SIZ Household and Basic Services

There are 10,836 households within the SIZ of which 16.96% are residing in informal dwellings (shacks), however, the largest majority (67.71%) reside in a formal house, which is lower than the average for Mpumalanga (76.86%) (Figure 4-6). On

average Mpumalanga had 83.8% households residing within formal housing during 2011, 10.9% in informal and 7.9% in traditional dwellings, as compared to 72.4%, 16.8% and 9.9% respectively for Gert Sibande and 82.8%, 13.9% and 2.4% respectively for Nkangala (Stats SA, 2014).

Poor road infrastructure exists within Nkangala and Steve Tshwete as heavy vehicles transporting coal travel along routes which are not designed to accommodate heavy vehicles, thus deteriorating the conditions of the roads (Nkangala District Municipality, 2017). Similar road conditions are experienced within Gert Sibande where many of the roads are utilised by coal trucks and result in damage to road infrastructure. Accidents that occur as a result of coal trucks also result in loss of life and livestock, affecting farmer's livelihoods (Gert Sibande District Municipality, 2017). Additionally, the poor conditions of the roads used by coal trucks result in high maintenance costs.

Within the SIZ, 71.37% of households receive their water through a regional or local water scheme with a high number of households (11.58%) relying on borehole water (Figure 57). According to Stats SA (2014), 71.7% of Mpumalanga households had access to piped water inside their dwelling or yard during 2011, followed by 81.6% in Nkangala and 81.3% in Gert Sibande, which is nearly 10% higher than the average for the SIZ.

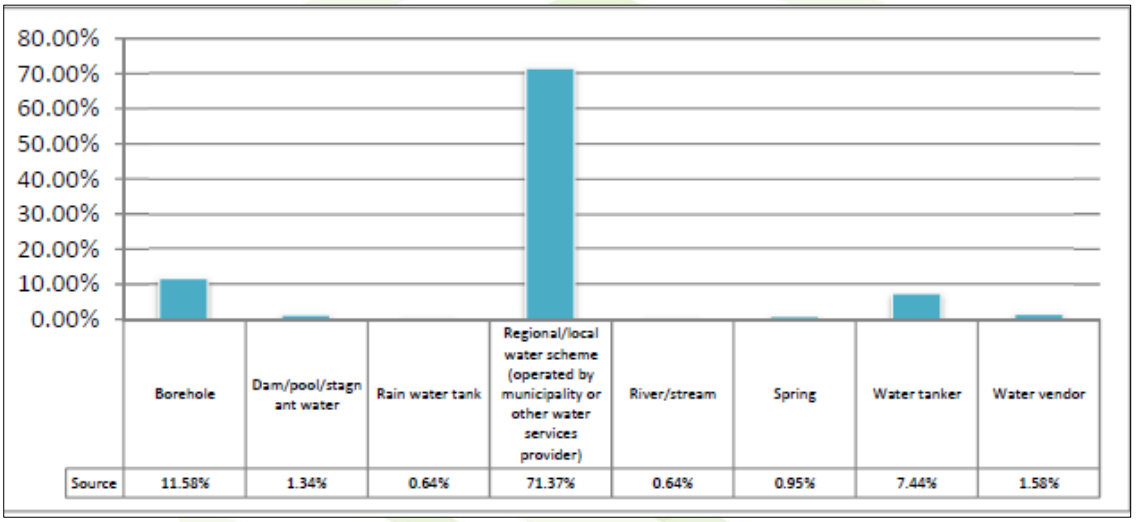


Figure 57: SIZ Source of water (Stats SA, 2012)

10.2.18 Socio-Economic Impact Source

The following broad level socio-economic impacts are expected to occur during the LOM of the Diep Vaalbank Coal Mine:

- 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.

An independent economic impact assessment (Derek Zimmerman) was undertaken concurrently with the SIA. The following impacts can usually be quantified for an economic assessment of a project (see **Error! Reference source not found.**)

Direct impact: The direct impact is calculated from macro-economic aggregates occurring as a direct result of the project. The initial impact on GDP for example, is taken from the financial information and equals the value added generated by a specific scenario.

Indirect impact: Indirect impacts are calculated from the activities of suppliers. For purposes of this study, indirect suppliers include those industries who deliver goods and services to the activity under discussion, being the construction of a dam (first round suppliers) including suppliers who on their part deliver goods and services to the first mentioned indirect suppliers.

Induced impacts: The impacts are the impacts on goods and services demanded due to the project. Examples include the income of employees and shareholders of the project as well as the income arising through the backward linkages of this spending in the economy.

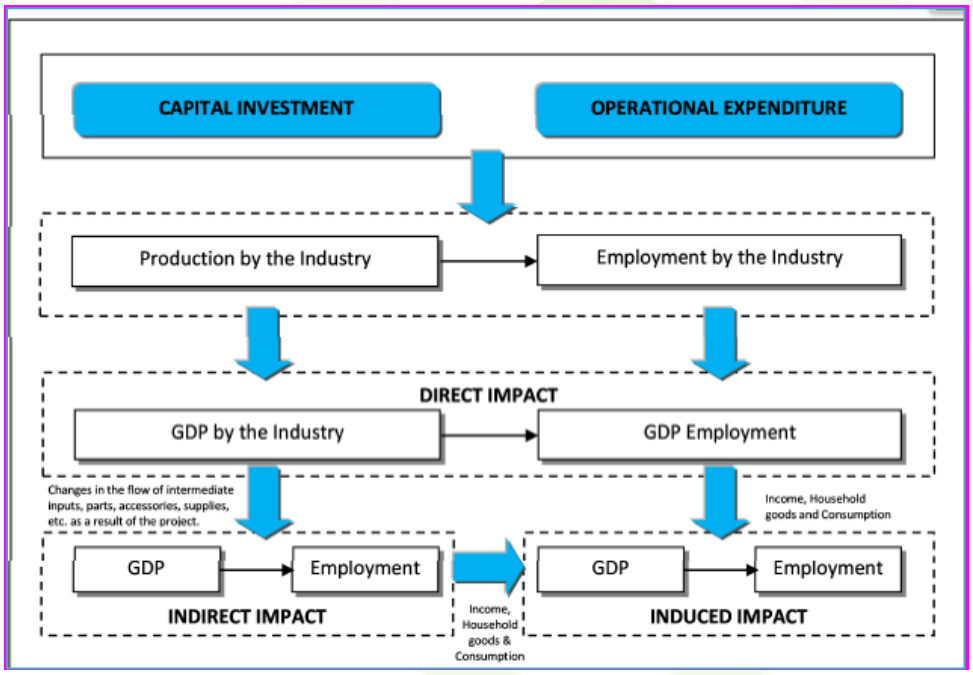


Figure 58: Economic Impact Assessment Methodology

The entire economic impact of the project into the regional and national economy is significant when the indirect and induced impacts are considered. When the entire value chain for the economic activities generated by the project is considered, then it is apparent that the project will have a significant impact for both GDP and employment within the regional economy.

10.3 Description Of Specific Environmental Features And Infrastructure On The Site

10.3.1 Specific Sensitive Environmental Features

Table 29: Specific Environmental Features associated with the site

Sensitive Environmental Features	Details
Wetlands and Surface Water	Regionally, both alternatives for the project falls within NFEPA wetland areas (namely class C and DEF). The wetlands on site, were identified as a **Channeled VP** and a **floodplain wetland** Which are associated with the Viskuile Spruit, Bank Spruit; Diepsloot; and Upper Olifants River. A 100 m buffer from these surface water features have been implemented The proposed access for Alternative 1 will however need to cross a Hillslope Seep (within an already disturbed footprint of the Kalabasfontein property on the north). This access has the least impact of the other access routes proposed for Alternative 1
Groundwater Quality	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. 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 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.
Ecological	Regionally, sensitive ecological habitats are associated with the riparian area of the wetland for both alternatives. Both Alternatives were however found to be ***moderately to heavily modified*** A 100m buffer is therefore proposed around wetland features

10.3.2 Specific Infrastructure on site

Table 30: Specific Infrastructure Features associated with the site

Aspect	Infrastructure
Blasting, Vibration and Fly Rock Unsafe Zone	• 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 blast hole diameter is the recommended material • There is on group of structures at POI 9 that is of concern. These structures are closest to Option 1 box-cut. The ground vibration levels predicted is higher than safe blasting criteria and will require attentions in the final design phase. The rest of the POI's identified are relative far from any of the three box-cuts. The possible influence at these POI's are low • 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.
Heritage	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.
Paleontological	There is some concern with the project due to the presence of the Vryheid Formation therefor all development activities must be stopped and a paleontologist should be called in to determine proper mitigation measures, especially for shallow caves.

10.4 Environmental Sensitivity And Current Land Use Map

Error! Reference source not found. below depict the environmentally sensitive areas, in relation to, the proposed project infrastructure. The riparian area and valley bottom wetland associated with the site are the main factors determining the overall site sensitivity map.

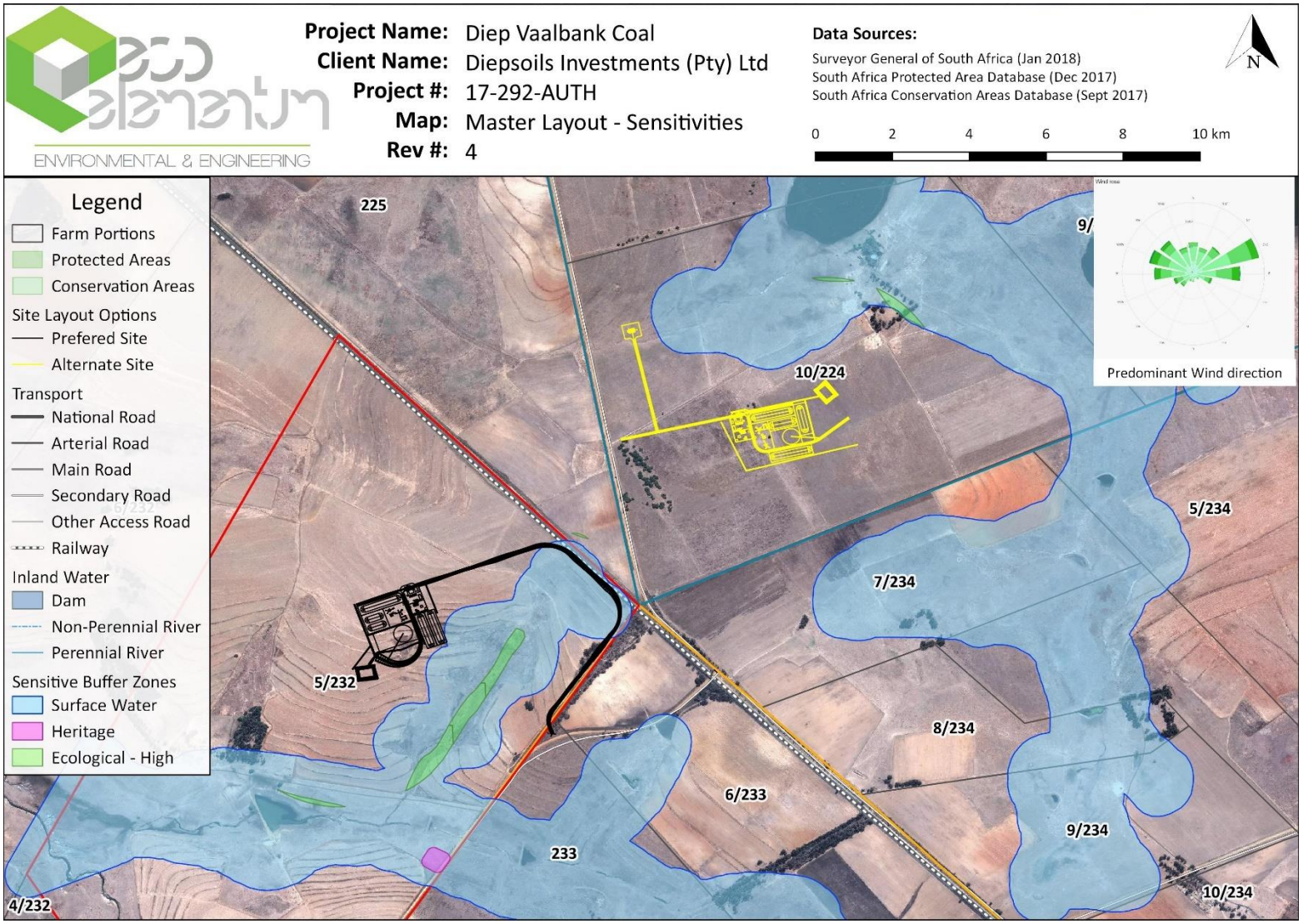


Figure 59: Overall Site Sensitivity

11. ITEM 3(G)(V): IMPACT ASSESSMENT PROCESS AND FINDINGS

11.1 Summary Of Impacts And Risks Identified By Specialists

This section summarises the main findings of various specialists' impact assessments with respect to the proposed project. The full impact assessment ratings (specialist impacts, general impacts and I&AP impacts) is included in Annexure 10, which details the magnitude, extent, duration, reversibility, probability and the overall significance of each impact identified.

11.1.1 Air Quality Impacts

Refer to Section 10.2.1.3

11.1.2 Soils, Land Use and Land Capability

Refer to Section 10.2.3.4

11.1.3 Surface Water

Refer to Section 10.2.3.4

11.1.4 Groundwater

Refer to Section 10.2.4.5

11.1.5 Flora & Fauna

Refer to Section 10.2.6.5

11.1.6 Heritage Sites and Palaeontological Resources

Refer to Section 10.2.8.1

11.1.7 Noise, Blasting and Vibration

Refer to Section 10.2.10.4

11.1.8 Visual

Refer to Section 10.2.14

11.1.9 Traffic

Refer to Section 10.2.11.1

11.1.10 Broad level Socio-Economic Environment

Refer to Section 10.2.18

11.1.11 Specific Issues raised by Interested and Affected Parties

Issues of specific concern to the precinct users, residents and municipality are as follows:

- That the project initiator brings in or uses its own resources or supply of labour to complete the construction and/or operational aspects of the project;
- That the project initiator reneges on its social and contractual obligations it has made regarding LED and B-BBEE.
- During construction there will be **excessive noise and dust**. This is also a specific issue raised by the landowner (Mr Michael C. Erasmus) of Portion 11 of the Farm Rietkuil namely. The existing main road transects his property and traffic will therefore be increased causing noise and dust
- **Loss of income** due to dust pollution and the effects thereof on Mr Michael C. Erasmus active sheep farming business (Alternative 1 and 2 will impact on Portion 11 due to the location of the existing main road)
- A potentially unsightly mining operation will be replacing a more pleasing agricultural operation **(visual and sense of place)**
- Access to the site and adjacent areas may be impeded or prohibited during the construction phase of the project **(Traffic)**
- Due to operating efficiency and security reason, certain sections of the precinct may be restricted from access during the operational phase of the project. (Traffic)
- Loss of arable land (raised by the landowner, Mr Ludolf Uys, Portion 10 of the Farm Rietkuil 224 IS. (Alternative 2) and income **(change in land use and loss arable land)**

Table 31: Specific issues raised by landowners and adjacent landowners

PROJECT ALTERNATIVE	RELEVANCE	FARM NAME/NUMBER	LANDOWNER	COMMENT
ALTERNATIVE 1 (KALABASFONTEIN)	LANDOWNER	PORTION 5 OF THE FARM KALABASFONTEIN 232 IS	FRED KADISH FREMAX FARMS	Owner not opposed to project, lease agreement to be in place prior to mining activities
ALTERNATIVE 2 (RIETKUIL)	LANDOWNER	PORTION 10 OF THE FARM RIETKUIL 224 IS	MR LUDOLF UYS	Opposed to mining project on this property
ALTERNATIVE 2 (RIETKUIL BENEFICIARY GROUP)	ADJACENT LANDOWNERS	VARIOUS PORTIONS	VARIOUS MEMBERS	Opposed to mining project on the Rietkuil Portions
ALTERNATIVE 1 AND 2	LANDOWNERS/ADJACENT LANDONWER TO MAIN MINING INFRASTURCTURE – EXISTING PROVINCIAL ROAD TRANSECTS HIS PROPERTY	Portion 11 of the Farm Rietkuil.	MICHAEL C ERASMUS	Noise and dust pollution from the main access road (R38) which traverses his property

11.2 Impact Assessment And Ranking Methodology

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.

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

Table 32: 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 >10 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.

11.2.1 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.

11.2.2 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 33: 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 34: 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 35: 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 36: 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.

11.2.3 Impacts Associated With Environmental Aspects of Alternative 1

Refer to Annexure 10 for the full Impact Assessment Rating Tables

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11.2.3.1 Assessment of each identified potentially significant impact and risk

Table 37: Assessment of Each Identified Potentially Significant Impact and Risk (Alternative 1)

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

ACTIVITY 1: IMPACTS RELATING TO CONSTRUCTION ACTIVITIES (footprint >25ha) (removal of soil and existing vegetation, site establishment, building of access road, vehicular movement, erection of all mining infrastructure etc					
Potential Impact/Cause of Construction Activities	**Affected Aspect**	**Project Phase**	**Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Cumulative dust, PM10 & PM 2.5 generation	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)	85 HIGH	**34** LOW-MEDIUM
Impaired water quality due to dust generation settling into nearby surface water bodies (Viskuile, Bank Spruit; Diepsloot; and Upper Olifants River)	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)	60 MEDIUM-HIGH	24 MEDIUM-HIGH
Runoff and spillages of dirty water into catchment.	SIZ Downstream water users Surface water Wetland	LOM	SIZ MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)	60 MEDIUM-HIGH	12 LOW TO MEDIUM

	Aquatic life				
Loss of topsoil due to – Erosion, Compaction and possible contamination	Soil and Land Use Capability	LOM	25.5ha	**85 HIGH**	36 LOW TO MEDIUM
Removal of vegetation and fragmentation of natural habitat.	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ Mining footprint (25.5ha) Greater water catchment	39 LOW-MEDIUM	31.2 LOW-MEDIUM
Removal of vegetation and fragmentation of natural habitat & Disruption/alteration of ecological life cycles.	Downstream water users Surface water resources Wetland Aquatic life	LOM	SIZ Mining footprint (>25.5ha) Greater water catchment	54 MEDIUM-	21.6 LOW-MEDIUM
Altering of natural hydrological regimes & due to increased stormwater runoff from site	Downstream water users Surface water resources Wetland Aquatic life	LOM	SIZ Mining footprint (>25.5ha) Greater water catchment	48 MEDIUM-HIGH	19.2 LOW
Siltation of surface water resources leading to deteriorated water quality	Downstream water users Wetland Aquatic life	LOM	SIZ Mining footprint (>25.5ha) Greater water catchment	48 MEDIUM-HIGH	9.6 LOW
Safety risk associated with additional traffic on local roads and haulage networks	Local community Faunal Community Air quality	LO	SIZ including local road network and farmers using the existing access route Pedestrians Town within close proximity	85 HIGH	68 LOW-MEDIUM

Reduction in air quality due to gaseous emissions from additional vehicles and trucks	Landowners, adjacent landowners, local community Faunal Communities Local Road network	LOM	SIZ	**42** **HIGH**	**25.6** **LOW-MEDIUM**
Increased noise levels on local level due to additional traffic flows	Landowners, adjacent landowners, local community Faunal Communities	LOM	SIZ	39 **LOW-MEDIUM**	**33.6** **LOW-MEDIUM**
Excessive noise levels (excess of 65 dBA) and vibration from blasting events	Landowners, adjacent landowners, local community Various structures identified as PO9 by the specialist Faunal Communities	LOM	SIZ	52 **MEDIUM-HIGH**	**31.2** **LOW-MEDIU**M
Damage to heritage and archaeological objects	Local community South African Heritage Resource (if significant)	Construction Operation	25.5HA	48 MEDIUM	**9.6** LOW
Negative socio-economic impacts (influx of workers into the area, noise and potential crime events)	Landowners, adjacent landowners, local community	LOM	SIZ	64 MEDIUM-HIGH	38.4 LOW-MEDIUM
Loss of arable land (change in land use)	Mpumalanga Agricultural sector Farmers and landowners	LOM	SIZ (especially landowners that are farmers 25.5HA	80 HIGH	80 HIGH
Positive Socio-economic impacts (job creation, increased spending power, multiplier effect, poverty alleviation) 120 direct jobs to be created	Local Community/job seekers GDP			60 MEDIUM-HIGH	

ACTIVITY 2: IMPACTS RELATING TO BOXCUT AND EXCAVATIIONS (footprint >25ha) Opening of boxcut of the declined shaft					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
aunal mortality and dispersal	Faunal Displacement and Mortality	Construction and Operation	60ha-100ha	48 MEDIUM	38.4 LOW-MEDIUM
Subsidence of land within the river catchment and subsidence of land underneath river channels Altered hydrological regime	Aquatic ecology Associated water features	Operational	Mining footprint 60ha + catchment	60 MEDIUM-HIGH	38.4 LOW-MEDIUM
Deterioration of water quality of surface water resources (wetlands and rivers) due to runoff of contaminants into the environment.	Aquatic ecology Associated water features and downstream water users	LOM	Mining footprint and local water catchment	60 MEDIUM-HIGH	24 LOW-MEDIUM

Blast and vibration impacts experiences by sensitive receptors (including rattling of roofs or door or windows, damage to properties etc)	Landowners, adjacent landowners, informal households	Construction Operation	MAR (>5,000HA)	48 MEDIUM	19.2 LOW-MEDIUM

ACTIVITY 3: UNDERGROUND MINING INCLUDING DEWATERING
Extraction of underground coal via the decline shaft
Dewatering of underground workings.

Aspect	Impact/Cause	Phase	Application project Scale	Significance WOM (Extent + Intensity + Duration + Probability) x WF	Significance WM (Residual Impacts) WOM x ME = WM
Risks associated to employees working underground (Health and Safety Aspects)	Underground Mining	Construction and Operation	A portion of 120 employees (scale not relevant)	60 MEDIUM-HIGH	24 LOW-MEDIUM
Impacts on groundwater volumes and hydrological regime due to active dewatering of the underground mining area	Groundwater	Construction and Operation	5,867 ha MRA + max drawdown influence	48 MEDIUM	19.2 LOW

ACTIVITY 4: ALL COAL HANDLING (ROM) COAL STOCKPILING, COAL PRODUCT STOCKPILE AND LOADING AREA, CRUSHING & SCREENING FACILITIES, PROCESSING PLANT) 25ha					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Cumulative dust, PM10 & PM 2.5 generation	SIZ Surface water features (coal fines and dust generation being deposited into wetlands and rivers) Aquatic life Surrounding land users (health related and economic viability of grazing capacity)	Operation, Decommissioning	SIZ	85 HIGH	68 MEDIUM-HIGH
Runoff and spillages of dirty water into catchment.	SIZ Downstream water users Surface water Wetland Aquatic life	Construction Operation Closure	SIZ Water Catchment	60 MEDIUM-HIGH	36 LOW TO MEDIUM
ACTIVITY 5: ALL MATERIAL STOCKPILE AREAS					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Erosion via wind and water leading to sedimentation and pollution of water resources	Hydrology, Wetlands & Aquatics	Construction, Operation, Decommissioning	Visual catchment	**64 HIGH**	**25.6 LOW-MEDIUM**

Potential source of AMD (Carbonaceous material) Leachate: A Sulphates & Metals	Hydrology, Wetlands & Aquatics	Operation, Decommissioning	Catchment and aquifer	**80 HIGH**	**16 LOW**
Cumulative dust, PM10 & PM 2.5 generation	Air Quality	Construction, Operation, Decommissioning	Visual catchment	**64 HIGH**	**25.6 LOW-MEDIUM**
Change in topographical nature of the area including sense of place	Air Quality Visual Sense of place	Construction, Operation, Decommissioning	Visual catchment SIZ	**42 HIGH**	**LOW-MEDIUM 25.2**

ACTIVITY 6: INTEGRATED DISCARD AND SLURRY DUMP
(Surface stockpiles, Topsoil stockpile; overburden stockpiles, discard stockpile, discard dump, ROM stockpile.
>10ha

Mitigation and Management Type	Compliance with Legislation	Phase	Application project Scale	Significance WOM (Extent + Intensity + Duration + Probability) x WF	Significance WM (Residual Impacts) WOM x ME = WM
Uncontrolled runoff and spillages of dirty water into surrounding environment, leading to contamination of water resources.	Surface and Groundwater Resources Aquatic life Downstream water users Ecology cycles	LOM	>10ha Water catchment	56 MEDIUM	22.4 LOW-MEDIUM
Potential source of AMD (Carbonaceous material) Leachate: A Sulphates & Metals	Hydrology, Wetlands & Aquatics	LOM	Catchment and aquifer	80 HIGH	32 LOW-MEDIUM
Long-term impacts on water quality due to poor quality seepage from the surface pollution source areas.	Surface and Groundwater Resources Aquatic life Downstream water users Ecology cycles	Post Closure	Mining footprint 60ha + catchment	MEDIUM-HIGH 60	24 LOW-MEDIUM
Dump will permanently alter the topographical nature of the area.	Visual Sense of Place	LOM	Mining footprint 60ha + catchment	48 MEDIUM-HIGH	28.8 LOW-MEDIUM

Potential for spontaneous combustion and associated emissions.	Operation	Potential for spontaneous combustion and associated emissions.		48 MEDIUM-HIGH	19.2 LOW
ACTIVITY 7: DIRTY WATER TRENCHES, PCD'S & OTHER SURFACE WATER MANAGEMENT CONTROL MEASURES					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Altered hydrological regime (flow) of the rivers and local catchment (Viskuile, Bank Spruit; Diepsloot; and Upper Olifants River))	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)a	68 MEDIUM-HIGH	27.2 LOW-MEDIUM-
Environmental pollution due to uncontrolled runoff in to surrounding environment and water resources.	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)ea	68 MEDIUM-HIGH	27.2 LOW-MEDIUM-
ACTIVITY 8: WATER SUPPLY AND STORAGE (POTABLE AND PROCESS WATER)					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Irresponsible use of water and water wastage.	Surface and groundwater resources Aquatic life Ecological life cycles	LOM	SIZ Catchment	68 MEDIUM-HIGH	27.2 LOW-MEDIUM

ACTIVITY 9 STAFF ABLUTIONS, CHANGE HOUSE WITH CONSERVANCY TANK					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Environmental pollution due to increased sedimentation and chemical runoff into the surrounding environment.	Surface and groundwater resources Aquatic life Ecological life cycles	LOM	SIZ Catchment	51 MEDIUM	20.4 MEDIUM-
Potential contamination of surface water bodies with sewage and nutrient enrichment of aquatic environments.	Surface and groundwater resources Aquatic life Ecological life cycles Downstream water users	LOM	SIZ Catchment	51 MEDIUM	20.4 MEDIUM
ACTIVITY 10: OPERATION OF STORES AND WORKSHOPS					
Aspect	**Impact/Cause**	**Phase**	**Application project Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Impaired water quality by hydrocarbon contamination on surface which could impact the environment through runoff and seepage.	Surface and groundwater resources Aquatic life Ecological life cycles Downstream water users	LOM	SIZ Catchment	60 MEDIUM-HIGH	12 LOW

Table 38: Assessment of Each Identified Potentially Significant Impact and Risk (Alternative 2, only where it differs from Alternative 1)

ATLERNATIVE 2 - ACTIVITY 1: IMPACTS RELATING TO CONSTRUCTION ACTIVITIES (footprint >25ha) (removal of soil and existing vegetation, site establishment, building of access road, vehicular movement, erection of all mining infrastructure etc					
Potential Impact/Cause of Construction Activities	**Affected Aspect**	**Project Phase**	**Scale**	**Significance WOM (Extent + Intensity + Duration + Probability) x WF**	**Significance WM (Residual Impacts) WOM x ME = WM**
Impaired water quality due to dust generation settling into nearby surface water bodies (Viskuile, Bank Spruit; Diepsloot; and Upper Olifants River)	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)	30 LOW- MEDIUM-	6 LOW
Runoff and spillages of dirty water into catchment.	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ MRA (Mining Right Boundary) >5000ha water catchment SIZ (recipients within 20km radius from the site)	30 MEDIUM-HIGH	6 LOW
Removal of vegetation and fragmentation of natural habitat.	SIZ Downstream water users Surface water Wetland Aquatic life	LOM	SIZ Mining footprint (25.5ha) Greater water catchment	28 LOW-MEDIUM	6 LOW
Removal of vegetation and fragmentation of natural habitat & Disruption/alteration of ecological life cycles.	Downstream water users Surface water resources Wetland Aquatic life	LOM	SIZ Mining footprint (>25.5ha) Greater water catchment	28 LOW-MEDIUM	6 LOW

Altering of natural hydrological regimes & due to increased stormwater runoff from site	Downstream water users Surface water resources Wetland Aquatic life	LOM	SIZ Mining footprint (>25.5ha) Greater water catchment	32 LOW-MEDIUM	12.8 LOW
Siltation of surface water resources leading to deteriorated water quality	Downstream water users Wetland Aquatic life	LOM	SIZ Mining footprint (>25.5ha) Greater water catchment	48 MEDIUM	9.6 LOW
Damage to heritage and archaeological objects	Local community South African Heritage Resource (if significant)	Construction Operation	25.5HA	64 MEDIUM-HIGH	**26** LOW-MEDIUM
Loss of arable land (change in land use)	Mpumalanga Agricultural sector Farmers and landowners	LOM	SIZ (especially landowners that are farmers 25.5HA	85 HIGH	85 HIGH

11.3 Possible Mitigation Measures For I&AP-Identified Impacts

The proposed mitigation measures or alterations that could be implemented specifically to address issues and concerns raised by I&APs are summarised below and discussed in terms of overall risks if these mitigation measures are implemented on site.

11.4 Motivation Where No Alternative Sites Were Considered

N/A

11.5 Statement Motivating The Alternative Development Location Within The Overall Site

Both Alternatives have associated negative and positive impacts. The outcome of the risk assessment is as follows (only where impact ratings differ between Alternatives)

Table 39: Alternatives Comparison Table

ALTERNATIVE	IMPACT ADVANTAGES	IMPACT DISADVANTAGES
Site/Layout Alternatives		
Alternative 1 (**Preferred Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 5 of the Farm Kalabasfontein 232 IS	• Less sensitive heritage features • Landowner agreement is in place • More site disturbance present (including existing access crossings of the Hillslope Seep) • The site has a **lower NFEPA** wetland class rating (DEF-Heavily to Critically modified)	• There are 4 houses on the property that houses people from the local community (Zikalala Household) which would have to be relocated) • Higher noise and vibration impacts identified • Crossing of a Hillslope Seep in order to gain access
Alternative 2 **(Alternative Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 10 of the Farm Rietkuil 224 IS	• Less noise and vibration impacts identified	• Landowner opposed to project • Higher Impact on sensitive heritage features (including graves) • More significant loss of arable land and income for landowner due to existing contracts (7year validity) • The site has a **higher NFEPA** wetland rating (C-Moderately Modified)

From the assessment undertaken by the EAP and the outcome of the Public Participation process it is evident that the Diep Vaalbank Coal project will have positive and negative impacts on a social, economic and environmental level. Die comparison of the two Alternatives show more or less similar impacts. However, the fact that the landowner of Alternative 2 (Portion 10 of the Farm Rietkuil 224 IS) is opposed to mining infrastructure on his property could render the project unfeasible for the application in the end. The owner of Alternative 1 (Portion 5 of the Farm Kalabasfontein 232 IS) has however agreed to enter into a lease agreement with the applicant. The impacts identified throughout this process can be mitigated to an

acceptable level and there are no fatal flaws identified on any of the sites. It is also important to note that Alternative 1 has been more subjected to previous anthropogenic impacts (mostly associated with farming practices) and therefore the site is not in a pristine condition.

11.6 Detailed Assessment Of Each Identified Potentially Significant Impact And Risk

Where an impact is as a result of overall surface activities as a whole, then this has been discussed once under "all infrastructure areas". Where impacts are specific to the activity then this is discussed under the specific activity / infrastructure below.

The full impact assessment table is presented in Annexure 10 only **impacts of negative moderate, moderate to high and high significance (pre-mitigation)** are summarised below:

The supporting impact rating assessment conducted by the EAP, and detailing all impacts, is attached as Annexure 10

All the proposed mitigation and management measures stipulated by specialists have been incorporated into the various tables of the EMP report as well as the overall management plan. Only specific recommendations from specialists are detailed below.

Table 40: Summary Specific Specialist Recommendations

Specialist Report	Specialist Recommendation
Diep Vaalbank Coal Air Quality Assessment Report (Ecoelementum, 2018).	• It is recommended that ambient air quality monitoring be established to get a baseline condition prior to onset of the operations and to establish the level at which the proposed operations are noted to impact on the ambient air quality. • Fallout monitoring should be continued for the life of mine to better assess the level of nuisance dust associated with both mining and process related operations. Sampling of fallout should be undertaken within the neighbouring areas as well as on-site. • Dust fallout monitoring should ideally be located on-site, at the crusher and in the vicinity of major material handling points and on next to any sensitive receptor areas located downwind from the emissions sources. • Indicative PM10 and PM2.5 dust monitoring must be undertaken at the same sites as indicated under the previous bullet and in and around potential fugitive emission sources to determine mitigation measures and focus management efforts. • The most significant impacts for the proposed development includes the crushing and screening facility, haul roads and material handling. • The mitigation and management measures discussed in this report should be sufficient to ensure the mining operation can be conducted with minimal impact on the receiving environment and therefore not have a detrimental effect.
Visual Impact Assessment (Ecoelementum, 2018)	• Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered. • Primary measures that will be implemented will mainly be measures that will minimise the visual impact by softening the visibility of the structures by "blending" with the surrounding areas. Such measures will include rehabilitation of the mining area by re-vegetation of the mining site and surrounding area. • Secondary measures designed to specifically address the remaining negative effects of the final development proposals. • Secondary measures will include final rehabilitation, after care and maintenance of the vegetation and to ensure that the final landform is maintained. • In addition, the following measures are recommended: o Plant some indigenous trees to create a barrier between the neighbours and roads; o Dust from Stockpile areas, roads and other activities must be managed by means of dust suppression to prevent excessive dust; o A wind barrier system that encloses the stockpiles and tailing dumps; o Stockpiles and waste rock dumps should not exceed 20m in height; and o Rehabilitation of the area must be done as the mining is completed.

Soil, land use, land capability and agricultural potential study for the Diep Vaalbank Coal project, Mpumalanga (Rossouw Associated, 2018)	• A Soil Management Plan (for all phases of the mine) must be in place prior to construction commencing.
	• The following objections should be described in the SMP:
	  ○ Address the prevention, minimisation and management of erosion, compaction and chemical soil pollution during construction, operations, decommissioning and closure;
	  ○ Describe soil stripping and stockpiling methods that will reduce the loss of topsoil;
	  ○ Define requirements and procedures to guide the Project Management Team and other project contractors;
	  ○ Define monitoring procedures.
	
	<u>Construction Phase Mitigation measures</u>
	
	• Minimise the surface disturbance footprint
	• All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined
	• Management and supervision of construction teams: The activities of construction contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site.
	• In addition, compliance to these instructions must be monitored.
	
	• **Stockpile Locations**:
	Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.
	
	• **Demarcation of topsoil stockpiles:**
	To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum
	• **Stockpiling of topsoil:**
	Ensure all topsoil stockpiles are clearly and permanently demarcated and located in defined no-go areas.
	
	• **Prevention of stockpile contamination:**
	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.
	
	• **Management of the terrain for stability**
	  ○ 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 and service road management**
	  ○ 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.
	  ○ 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.
	  ○ The side drains on the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used.
	
	• **Prevention of soil contamination (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.

Operational Phase Mitigation measures

- **General Soil Management**
  - It is recommended that concurrent rehabilitation techniques be followed to prevent topsoil from being stockpiled too long and losing its inherent fertility but opportunities may be limited by the layout of the operation
  - As new stockpiles are created, they should be re-vegetated immediately to prevent erosion and resulting soil losses from these stockpiles
  - 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).
  - 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.
  - Routine monitoring will be required in and around the sites.

- **Prevention of soil contamination**
  - Stockpiles are 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 stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. 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, are contained and appropriate means provided for treating and disposing of liquids and solids;
  - Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors or slurry from scrubbing systems);
  - Solids and slurries are disposed of in a manner consistent with the nature of the material and avoids contamination; and
  - Effluent and processing drainage systems avoid leakage to ground

Closure and Decommissioning Phase Mitigation measures

- **General Soil Management**
  - The activities of decommissioning contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition, compliance to these instructions must be monitored.
  - All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site.
  - 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.
  - 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. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated • **Prevention of soil contamination** 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.
Groundwater impact study- (Geo Pollution Technologies,2018)	**<u>Construction Phase</u>** **(*Objective 1: Prevention of hydrocarbon leakage)*** • It must be ensured that a credible company removes used oil after vehicle servicing • A sufficient supply of absorbent fibre should be kept at the site to contain accidental spills • Remove or remediate areas of hydrocarbon contaminated soils by following a risk based approach, take action if a negative risk is found. A risk assessment should be conducted by a qualified hydrogeologist **<u>Operational Phase</u>** ***(Objective 1: Minimize the impact of dewatering of aquifer and loss of groundwater flow)*** • Store all potential sources in secure facilities with appropriate storm water management, ensuring contaminants are not released into the environment. ***(Objective 2: The minimise the impact of leachate from contaminant sources such as stockpiles, PCD's etc)*** • Monitor static groundwater levels on a quarterly basis in all boreholes within a zone of one kilometre surrounding the mines to ensure that any deviation of the groundwater flow from the idealised predictions is detected in time and can be reached on appropriately. • If it can be proven that the mines are indeed affecting the quantity of groundwater available to certain users, the affected parties should be compensated. This may be done through the installation of additional boreholes for water supply purposes, or an alternative water supply. ***(Objective 3: To minimize Rebound & Decant)*** • The numerical model should be updated during operation of the mines by using the measured inflows, water levels and drilling and pump test information to re-calibrate and refine the impact prediction **<u>Decommissioning Phase</u>** ***(Objective 1: To minimize leachate from contaminant sources such as stockpiles, PCD's etc)*** • Monitor static groundwater levels on a quarterly basis in all boreholes within a zone of one kilometre surrounding the mines to ensure that any deviation of the groundwater flow from the idealised predictions is detected in time and can be reacted on appropriately. • Apply best practice mining methods, where possible remove contaminant sources • Develop a closure management plan for groundwater management • The numerical model should be updated during closure of the mines by using the measured inflows, water levels and drilling and pump test information to re-calibrate and refine the impact prediction

	• The final backfilled void topography should be engineered such that runoff is directed away from the opencast areas. • Treatment of the decant may be viable, however all passive methods should be investigated first during the operational phase of the mine • Major fractures encountered while mining must be sealed by grouting, both on inflow and outflow areas
Aquatic Ecological Study (Menco, 2018)	• Bio-monitoring must be done on a bi-annual basis to ensure more accurate results for season variability between dry and wet season conditions. • Surface water should be monitored on a bi-annual basis to successfully relate the change in habitat conditions to that of the water quality. Surface water monitoring and bio-monitoring should continue once the mining operations have started. • Establish a data basis which contains the monitoring and bio-monitoring data from the current and future assessments. • Apply for a Water use Licence once long term databases has been established for surface water. • With the current health class having a C rating it is important that the mine maintain this health class as this is also the health class currently expected for the catchment. • Protect and rehabilitate wetland areas to ensure that the current integrity and functions are maintained, as well as removing alien vegetation within riparian zones and replacing it with endemic species. • It has been observed that the river systems within these regions are to a notable extent being diverted in to farm dams for extraction and irrigation purposes. It is thus important to track these activities and take note of effects that these activities might have on especially the flow conditions of tributary sites during the dry season conditions.
Wetland Delineation (Menco, 2018)	• A buffer zone of 100 m should be maintained at all wetlands associated with high risk areas for subsidence. These areas, as well as the buffers around them, should be excluded from the mine plan; • Undermined streams and the required stability of pillars in proposed working areas needs to be determined and monitored; • Rock pillar safety factors as proposed in a rock mechanic report should be implemented and maintained; • The state of the wetlands and any subsidence in the mining area needs to be monitored by applying appropriate technology; • Wetland monitoring to be conducted annually
Ecological Assessment Report (Ecoelementum, 2018)	• Ecological buffers proposed (100m from the wetland areas should be adhered to and be excluded from the mining footprint) • The existing stand of Eucalyptus trees at Vaalbank must be retained and not removed as it will aid in dust management, visual effects and soil management. • Minimise the surface disturbance footprint • All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined • It is important that all staff and contractors are made aware of the fact that animals do occur on the site and that it is made very clear that animals are not to be harmed, captured, trapped or disturbed during construction and operations • The natural vegetation within the proposed area where the development will take place will be totally destroyed; it is recommended that large trees are marked prior to clearing to ensure they are not damaged. • All topsoil should be stored separately from other spoil in order to be used as final cover after rehabilitation. • A biodiversity baseline assessment should be conducted and form the basis of a Biodiversity Action Plan (BAP). The BAP should include a biodiversity management plan that states the protocol for concurrent mine rehabilitation and the frequency of monitoring • Any important species such as red data plants and animals, medicinal plants, protected species and any endemic species found on site during site layout, should be listed and their location recorded in order to remove these species prior to any development. • An alien invasive monitoring, eradication and control Programme is mandatory • Traps should preferably be set prior to construction in order to catch and relocate any species of conservation concern. • All necessary permits should be obtained from the relevant Authorities, prior to removal of any plants.

	• 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. • Management plan for the control of invasive and exotic plant species need to be implemented. Specialist advice should be used in this regard and should be budgeted for. This should include pre-treatment, initial treatment and follow-up treatment. The cleared areas should be re-vegetated with indigenous naturally occurring species to decrease large patches of bare soil. Closure will not be provided if mitigation of alien invasive species was not adhered to. • Rehabilitation should take place concurrently. 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. A report should be written and stored to be made available and should be available at all times. • The monitoring of biodiversity should include the following: o Seasonal visual assessment of areas to determine if vegetation in undisturbed areas is being impacted. o 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. o Continue with alien invasive monitoring, eradication and control programme. o 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.
A Phase 1 Archaeological Impact Assessment (Tobias Coetzee, 2018)	• 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. • Should Alternative 2 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. • Because the settlement remains falling within the area marked as 'Sensitive' on **Error! Reference source not found.** are 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. • .
Paleontological Impact Assessment Phase 1 Field Study (Dr Heidi Fourie, 2018)	• There is some concern with the project due to the presence of the Vryheid Formation. All the Alternatives will be situated on the Vryheid Formation. The depth of the Formation can be verified with geological cores. The topsoil, subsoil and overburden must be surveyed for fossils and Mitigation is needed for the shale layer if fossils are present. • Should further fossil material be discovered during the course of the development (e. g. during bedrock excavations), this must be safeguarded, where feasible in situ, and reported to a

	palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (e. g. Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample. • A Phase 2 Paleontological Mitigation is only required if the Phase 1 Palaeontological Assessment identified a fossiliferous formation or surface fossils or if fossils are found during construction or mining. Fossils were not found during the walk through. • Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment and adjacent areas as well as for safety and security reasons.
Noise Impact Assessment (Ecoelementum, 2018)	• 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 • 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.
Blast and Vibration Impact Assessment (Blast Management & Consulting,2018)	• It is recommended that a standard blasting time is fixed and blasting notice boards setup at various routes around the project area that will inform the community of blasting dates and times. • 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.
Socio-Economic Impact Assessment Report (Gibb, 2018)	• In order to soften the social and economic change related to the proposed mining activities, the following is recommended: • Consider the establishment of a Community Monitoring Forum (CMF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The CMF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local councilors (within the SIZ), affected landowners and the contractor(s). • A comments and complaints register, accessible to members of public, should be implemented and maintained by the main contractor • In order to address any potential health impacts, it is advised that the applicant, along with the appointed contractor(s), devise and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. All permanent employees should receive Health and Safety, including basic HIV/AIDS awareness training at the onset of their employment

	• Furthermore, the movement of construction workers on and off the site should be closely managed and monitored by the applicant. In this regard the necessary arrangements should be made for the housing and transport of temporary construction workers. Allowance should be made for workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks. • 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. • Adhere to the principles and objectives op the Social Labour Plan and monitor progress annually (performance review)
Final rehabilitation, decommissioning and mine closure plan (Ecoelementum,2018)	• The following closure criteria is relevant to the Closure Phase; o Ground and surface water: Compliance with the IWUL and supporting IWWMP o Aquatic ecosystems: Wetland and aquatic macro invertebrate populations at predefined locations using appropriate biomonitoring techniques o Air Quality: Compliance with the standards as per the National Environmental Management: Air Quality (Act 39 of 2004) and Dust Control Regulations o Soil Quality: Soil quality as assessed against the Norms and Standards to support Chapter 8 of NEM:WA o Land Capability: Land capability and productivity similar to or enhanced from that which existed prior to mining o Erosion: Implementation or construction of erosion control measures o Safety / stability: The site is safe for use by humans and animals, also focusing on the foreseeable future o Vegetation: Establishment of self-sustaining vegetation populations which stabilizes soils and is not invasive to the region • Adhere to DWS' Best Practice Guideline (BPG5): Water Management Aspects for Mine Closure guidelines regarding the rehabilitation strategy: o Management measures at closure should primarily be of a passive nature with minimal long-term maintenance and operating costs. o The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. o 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. o 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; o Biodiversity plan will address issues that are interrelated with the mine water management plan, particularly with regard to the environmental water balance and the effects that mining may have thereon. • Annual reports will be prepared to document the results of the monitoring during the rehabilitation, decommissioning, closure and post-closure phases • The applicant must ensure the necessary provision is made for the closure liability calculated associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMR following authorisation of the project.

Attach copies of Specialist Reports as Appendices (Annexure 6)

12. ENVIRONMENTAL IMPACT STATEMENT

12.1 Summary Of The Key Findings Of The Environmental Impact Assessment And Positive And Negative Impacts Identified

12.1.1 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).

Refer to Table 37 **and Annexure 10**

12.2 Final Site Map

From the assessment undertaken by the EAP and the outcome of the Public Participation process it is evident that the Diep Vaalbank Coal project will have positive and negative impacts on a social, economic and environmental level. Die comparison of the two Alternatives show more or less similar impacts. However, the fact that the landowner of Alternative 2 (Portion 10 of the Farm Rietkuil 224 IS) is opposed to mining infrastructure on his property could render the project unfeasible for the application in the end. The owner of Alternative 1 (Portion 5 of the Farm Kalabasfontein 232 IS) has however agreed to enter into a lease agreement with the applicant. The impacts identified throughout this process can be mitigated to an acceptable level and there are no fatal flaws identified on any of the sites. It is also important to note that Alternative 1 has been more subjected to previous anthropogenic impacts (mostly associated with farming practices) and therefore the site is not in a pristine condition.

Figure 60: Final Site Map

12.3 Summary Of Risks Of The Proposed Activity And Identified Alternatives

Refer to **Error! Reference source not found.** for the detailed risk assessment for Alternative 1 and 2.

ALTERNATIVE	IMPACT ADVANTAGES	IMPACT DISADVANTAGES
Site/Layout Alternatives		
Alternative 1 (**Preferred Site)**	• Less sensitive heritage features	• There are 4 houses on the property that houses people from the local community (Zikalala Household) which would have to be relocated)

Mining operation and associated mining infrastructure of 25 ha on Portion 5 of the Farm Kalabasfontein 232 IS	• Landowner agreement is in place • More site disturbance present (including existing access crossings of the Hillslope Seep) • The site has a **lower NFEPA** wetland class rating (DEF-Heavily to Critically modified)	• Higher noise and vibration impacts identified • Crossing of a Hillslope Seep in order to gain access
Alternative 2 **(Alternative Site)** Mining operation and associated mining infrastructure of 25 ha on Portion 10 of the Farm Rietkuil 224 IS	• Less noise and vibration impacts identified	• Landowner opposed to project • Higher Impact on sensitive heritage features (including graves) • More significant loss of arable land and income for landowner due to existing contracts (7year validity) • The site has a **higher NFEPA** wetland rating (C-Moderately Modified)

13. IMPACT MANAGEMENT OBJECTIVES AND IMPACT MANAGEMENT OUTCOMES

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts, assess their significance and implement appropriate mitigation and management measures to either avoid, minimise and/or remediate the associated impacts where they cannot completely be avoided.

- Implement an adequate monitoring programme to:

    - Ensure that mitigation and management measure are effective.
    - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
    - Reduce duration of any potential negative impacts.

Table 41: 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 speciied 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

14. FINAL PROPOSED ALTERNATIVES

From the assessment undertaken by the EAP and the outcome of the Public Participation process it is evident that the Diep Vaalbank Coal project will have positive and negative impacts on a social, economic and environmental level. Die comparison of the two Alternatives show more or less similar impacts. However, the fact that the landowner of Alternative 2 (Portion 10 of the Farm Rietkuil 224 IS) is opposed to mining infrastructure on his property could render the project unfeasible for the application in the end. The owner of Alternative 1 (Portion 5 of the Farm Kalabasfontein 232 IS) has however agreed to enter into a lease agreement with the applicant. The impacts identified throughout this process can be mitigated to an acceptable level and there are no fatal flaws identified on any of the sites. It is also important to note that Alternative 1 has been more subjected to previous anthropogenic impacts (mostly associated with farming practices) and therefore the site is not in a pristine condition.

The cumulative impacts of mining such as water pollution, dust pollution, loss of arable land, increase in traffic loads on local road networks and the loss of “sense of place” is however relevant on a local and regional scale. The positive socio-economic impacts related to the project (including 120 direct jobs created, contribution to the GDP and the meeting of international and national coal demands) carries a lot weight in a country where unemployment and a struggling economy is a national concern. The project is in line with national governmental strategies and is not conflicting with Provincial and Local Plans (Spatial Development Frameworks and Integrated Development Plans of Gert Sibande District Municipality and Steve Tshwete Local Municipality). The management of impacts and the undertaking of monitoring requirements must be implemented throughout the LOM and regularly audited as per the Environmental Management Plan. The applicant must provide a Financial Guarantee to successfully rehabilited and return the site to an acceptable landform once mining activities has ceased.

It is hereby recommended by the EAP that the applicant is granted a positive decision for Alternative 1 and that Environmental Authorisation contains conditions as outlined below:

15. ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

- A 100m buffer zone must be maintained throughout the LOM and where it cannot be avoided (access road across a Hillslope seep), a Water Use License must be applied for (specifically for Section 21 c and i water uses)
- The 100m buffer zone must be demarcated and marked as a no-go zone for employees and contractors
- It is essential that the mining footprint is kept to a minimum to minimize the loss of topsoil and arable land. A Soil Management Plan must be prepared prior to site clearance commencing
- A valid lease agreement with the landowner of Alternative 1 (Mr Fred Kadish of Fremax Farms) must be in place prior to construction activities commencing
- A Water Use License for all the identified water uses must be in place prior to construction commencing
- All recommendations made by the various specialists must be implemented through the LOM
- The Health and Safety of the mine's employees must be prioritised and awareness training must be on-going. In order to address any potential health impacts, it is advised that the applicant, along with the appointed contractor(s), devise and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. All permanent employees should receive Health and Safety, including basic HIV/AIDS awareness training at the onset of their employment
- The implementation of the Social Labour Plan (SLP) is key to the local economic benefit of the project
- Monitoring of surface water quality, groundwater quality and groundwater quantity, aquatic ecological health via biomonitoring, dust levels (specifically PM2.5 and PM10), ecological status via the Biodiversity Action Plan and Soil Management Plan, noise levels and the integrity of mining infrastructure that could cause harm to the receiving environment is essential to the project's long term environmental footprint
- The recommendations and principles of the Stormwater Management Plan must be adhered to
- A comments and complaints register, accessible to members of public, should be implemented and maintained by the main contractor prior to construction commencing
- The mine should strive to apply good housekeeping practices where and when possible.
- The adherence to other relevant national and provincial pieces of legislation governing any aspect of the mining activity must be assessed throughout the LOM

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

- Soil Study

The final layout that was provided by the applicant on 25 April 2018 for the proposed Preferred Alternative is outside of the areas where the detail soil surveys were conducted. This is a significant limitation to this study and hinders the accuracy of the impact assessment of the proposed project on the current in situ soil properties and associated land capabilities. The report therefore discusses the baseline soil properties and land capabilities of the three areas assessed (as was indicated during the initiation of the study) as well as the anticipated impacts of the proposed project on soils of these properties and capabilities. This lack of data for the newly finalised layout of the Preferred Alternative necessitates the assumption that the soil underlying this proposed surface infrastructure is of very high agricultural potential and that the impacts of the proposed project on the productivity and yield potential of the soil will be negative and highly significant.

- Geo-hydrological Study

Modelling was done within the limitations of the scope of work of this study and the amount of data available. Although all efforts have been made to base the model on sound assumptions and has been calibrated to observed data, the results obtained from this exercise should be considered in accordance with the assumptions made. Especially the assumption that a fractured aquifer will behave as a homogeneous porous medium can lead to error. However, on a large enough scale (bigger than the REV, Representative Elemental Volume) this assumption should hold reasonably well. Additionally, the simplistic mining layout is insufficient to make accurate calculations for the contaminant transport situation.

- Ecological Study

Up to date resources were used to conduct the desktop study, however, it is possible that additional information become available in time. Eco Elementum (Pty) Ltd cannot be held responsible for conclusions and pro-active mitigation measures that are made in good faith based on the available resources and information provided at the time of the study. As a result of the very secretive and unpredictable movement of most reptile and mammal species, as well as the migratory movements of birds, coupled with the limited time and funding availability, information and results found within the study should/can therefore only be used as a general guideline.

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

17.1 Reasons Why The Activity Should Be Authorized Or Not

The cumulative impacts of mining such as water pollution, dust pollution, loss of arable land, increase in traffic loads on local road networks and the loss of "sense of place" is however relevant on a local and regional scale. The positive socio-economic impacts related to the project (including 120 direct jobs created, contribution to the GDP and the meeting of international and national coal demands) carries a lot weight in a country where unemployment and a struggling economy is a national concern. The project is in line with national governmental strategies and is not conflicting with Provincial and Local Plans (Spatial Development Frameworks and Integrated Development Plans of Gert Sibande District Municipality and Steve Tshwete Local Municipality). The management of impacts and the undertaking of monitoring requirements must be implemented throughout the LOM and regularly audited as per the Environmental Management Plan. The applicant must provide a Financial Guarantee to successfully rehabilited and return the site to an acceptable landform once mining activities has ceased.

It is hereby recommended by the EAP that the applicant is granted a positive decision for Alternative 1 and that Environmental Authorisation contains conditions as outlined below:

17.2 Conditions That Must Be Included In The Authorisation

17.2.1 Specific Conditions to Be Included Into the Compilation and Approval of the EMPR

- A 100m buffer zone must be maintained throughout the LOM and where it cannot be avoided (access road across a Hillslope seep), a Water Use License must be applied for (specifically for Section 21 c and i water uses)
- The 100m buffer zone must be demarcated and marked as a no-go zone for employees and contractors
- It is essential that the mining footprint is kept to a minimum to minimize the loss of topsoil and arable land. A Soil Management Plan must be prepared prior to site clearance commencing
- A valid lease agreement with the landowner of Alternative 1 (Mr Fred Kadish of Fremax Farms) must be in place prior to construction activities commencing
- A Water Use License for all the identified water uses must be in place prior to construction commencing
- All recommendations made by the various specialists must be implemented through the LOM
- The Health and Safety of the mine's employees must be prioritised and awareness training must be on-going. In order to address any potential health impacts, it is advised that the applicant, along with the appointed contractor(s), devise and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. All permanent employees should receive Health and Safety, including basic HIV/AIDS awareness training at the onset of their employment
- The implementation of the Social Labour Plan (SLP) is key to the local economic benefit of the project
- Monitoring of surface water quality, groundwater quality and groundwater quantity, aquatic ecological health via biomonitoring, dust levels (specifically PM2.5 and PM10), ecological status via the Biodiversity Action Plan and Soil

Management Plan, noise levels and the integrity of mining infrastructure that could cause harm to the receiving environment is essential to the project's long term environmental footprint

- The recommendations and principles of the Stormwater Management Plan must be adhered to
- A comments and complaints register, accessible to members of public, should be implemented and maintained by the main contractor prior to construction commencing
- The mine should strive to apply good housekeeping practices where and when possible.
- The adherence to other relevant national and provincial pieces of legislation governing any aspect of the mining activity must be assessed throughout the LOM

17.2.2 Rehabilitation Requirements

Refer to the Rehabilitation and Closure Report (Annexure 8)

18. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The project life is estimated at **20 years.**

19. 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.

20. FINANCIAL PROVISION

As per NEMA financial provision regulations, itemised costs must be provided within the financial provision. As the DMR's closure cost assessment provides itemised costs, this process was used to determine the quantum for financial provision. Refer to Section 27.2 for the financial provision details and findings.

Financial Provision will 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.

The Financial Mine Closure Quantum is determined in accordance with the requirements of the 'Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (2005)' - Official guideline as contemplated in Regulation 54(1) to the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

The Mineral and Petroleum Resources Development (Act 28 of 2002) places the financial provision into context with respect to relevant constitutional considerations and the overall government policy currently prevailing in South Africa, as well as within a broader environmental legal framework. This guideline serves as a guide to the interpretation and application of the provision of the MPRDA, 2002 (Act 28 of 2002) and its Regulations, specifically as they relate to financial provision for the mining industry. This document is an official guideline in terms of regulation 54(1) promulgated in terms of the MPRDA, 2002 (Act 28 of 2002) and serves the specific objectives to;

Improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of prospecting and/or mining operations;

Enable the DMR to adequately evaluate/review the quantum for financial provision submitted by the mining industry. This review will cover the financial provision for premature closure at any time (the current environmental liability); and

Provide the DMR Regional Office personnel with a comprehensive and useful guideline on the generally accepted closure methods.

The Master Rates in this document will be updated on an annual basis, based on CPIX or a similar approved method. The first of these updates will take place during 2005 and continue to the year in which the review is taking place, and the overall document will be reviewed and updated whenever necessary (minimum requirement of annual updates).

The figure below indicates the process and possible "routes" to be followed in the assessment of the quantum for financial provision for closure. The table below is a summary of the procedural steps to be taken to calculate the quantum of financial provision required.

In terms of the new Financial Provision Regulations, a holder will have 39 months to assess, review and adjust the sum of the financial provision in accordance with Regulation 9 and 11. Failure to do so will mean that the existing approved financial provision will lapse after 45 calendar days after the lapsing of the 39 month period.

21. DEVIATIONS FROM THE APPROVED SCOPING REPORT

21.1 DEVIATIONS FROM THE METHODOLOGY FOR IMPACT AND RISK ASSESSMENT

Alternative 1 was updated to include a new access road and the mining infrastructure has been moved out of the recommended 100m buffer zone (except where it cannot be avoided such as the access road– whereby a water use license must be applied for)

21.2 MOTIVATION FOR THE DEVIATION

Recommendation of Specialist

Detailed geological logs completed

22. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

22.1 Compliance With The Provisions Of Sections 24(4) (A) And (B) Read With Section 24 (3) (A) And (7) Of NEMA, The EIA Report

22.1.1 Impact on the Socio-Economics of Any Directly Affected Person

- Refer to Table 10 and Table 11 respectively.

22.1.2 Impact on Any National Estate Referred To In Section 3(2) Of the National Heritage Resources Act

- 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. 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.

23. OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4) (A) & (B) OF THE ACT

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

Refer to the risk impact assessment section above for both alternatives.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

24. DETAILS OF THE EAP

EAP:	Eco Elementum Environmental and Engineering (Pty) Ltd
Contact Person:	Vernon Siemelink (Responsible EAP) Carene Kruger (Senior Environmental Impact Assessor)
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E-mail:	vernon@ecoelementum.co.za; carene@ecoelementum.co.za; info@ecoelementum.co.za
Postal Address:	26 Greenwood Crescent, Lynnwood Ridge, 0040
Physical Address:	442 Rodericks Road, Lynnwood, Pretoria 0081

25. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Table 42: Description of the Overall Diep Vaalbank Coal Activity

ITEM	DETAIL
Type of mineral	Coal
Mining method	Conventional Board and Pillar mining by means of drill and blast.
Mineral Processing	Crushing and Screening
Mineral Right Area and overall application area	5,626 ha
Physical Mining Footprint	25 ha
Depth of the mineral below surface	The dominant seams are Seam No.2 with average thickness of 1.00m, Seam No. 4 with an average thickness of 2.03m and Seam No. 5 with an average thickness of 0.80m The coal seams are relatively shallow, less than 150m below surface
Geological formation	Located on the southern edge of the Witbank Coalfield. In the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic levels.
Life of mine	>10 Years.
Production rate	Alternative 1/ Phase 1 (Vaalbank): The ROM coal inventory is predicted at 13.4 million tonnes. Based on the estimated potential ROM tonnages and three mining production section at 25,000 tonnes per month the project has a LOM of 16 years. Alternative 2/Phase 2 (Rietkuil) The ROM coal inventory is indicated at 13.4 million tonnes. Based on the estimated potential ROM tonnages and three mining production section at 25,000 tonnes per month the project has a LOM of 20 years.
Saleable Product	The mine will target primarily export markets as a RB1 quality.
Target Market	International (Export) or National (Eskom)

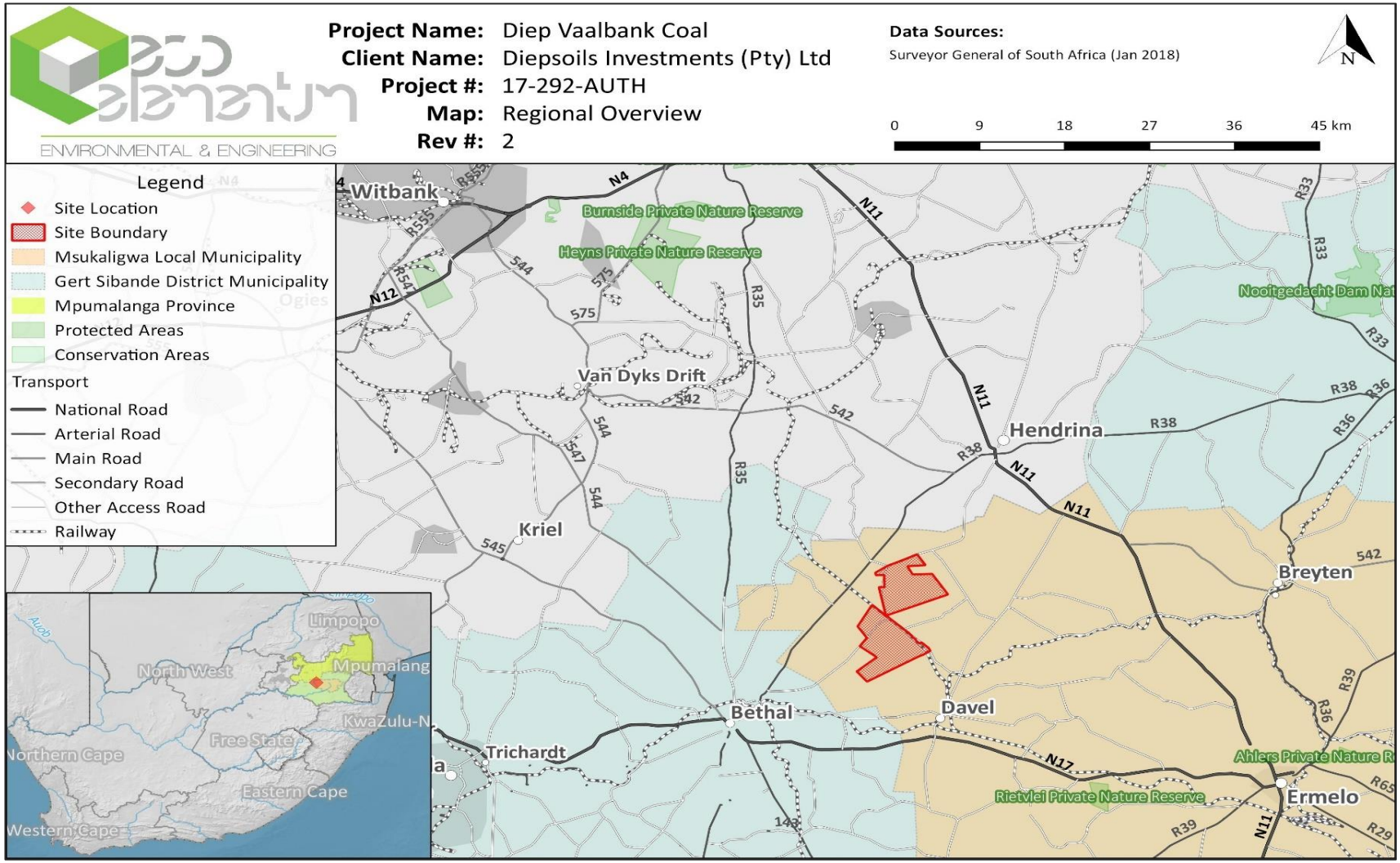

Figure 61: Regional Overview Map

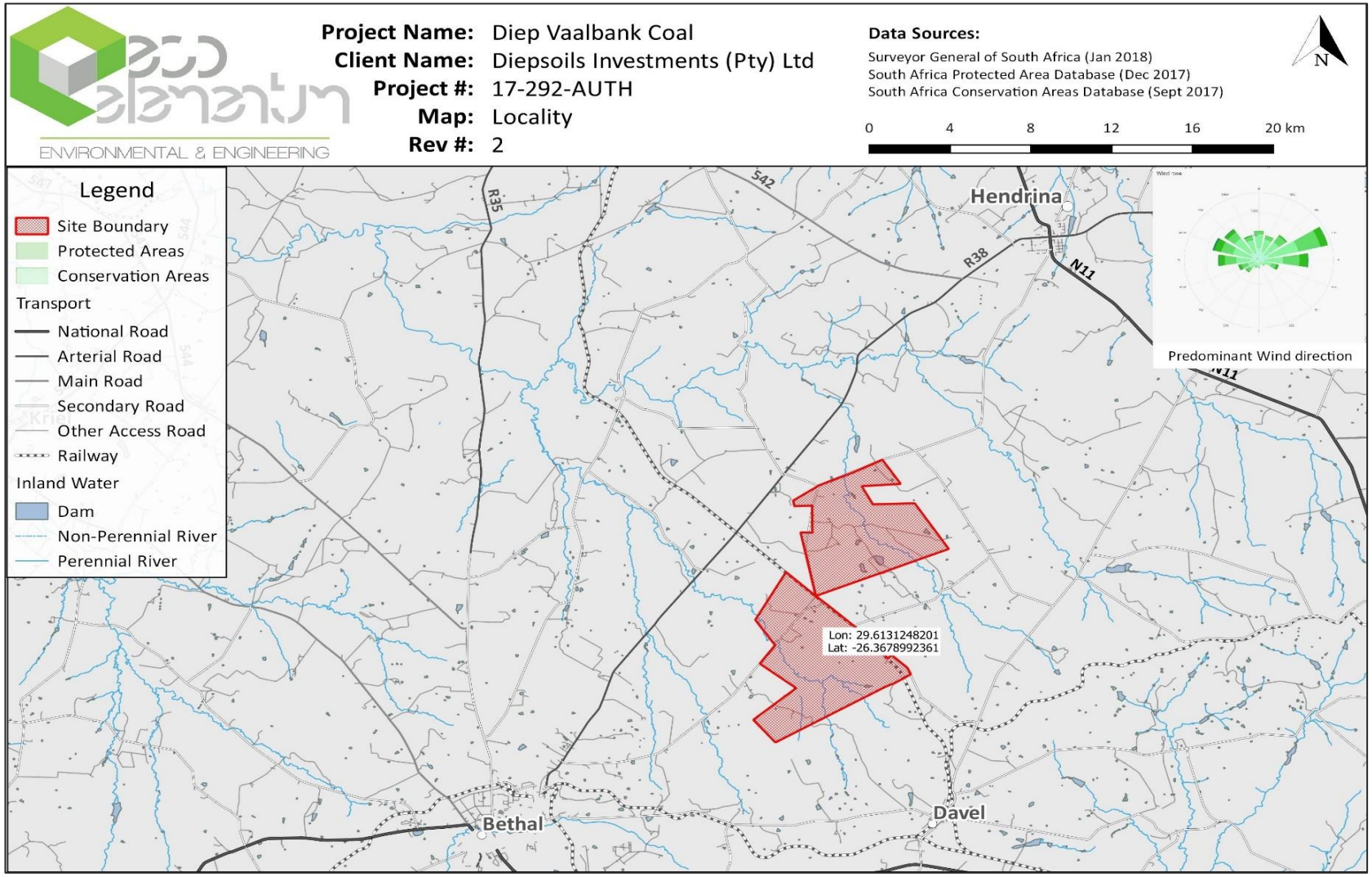

Figure 62: Locality Map

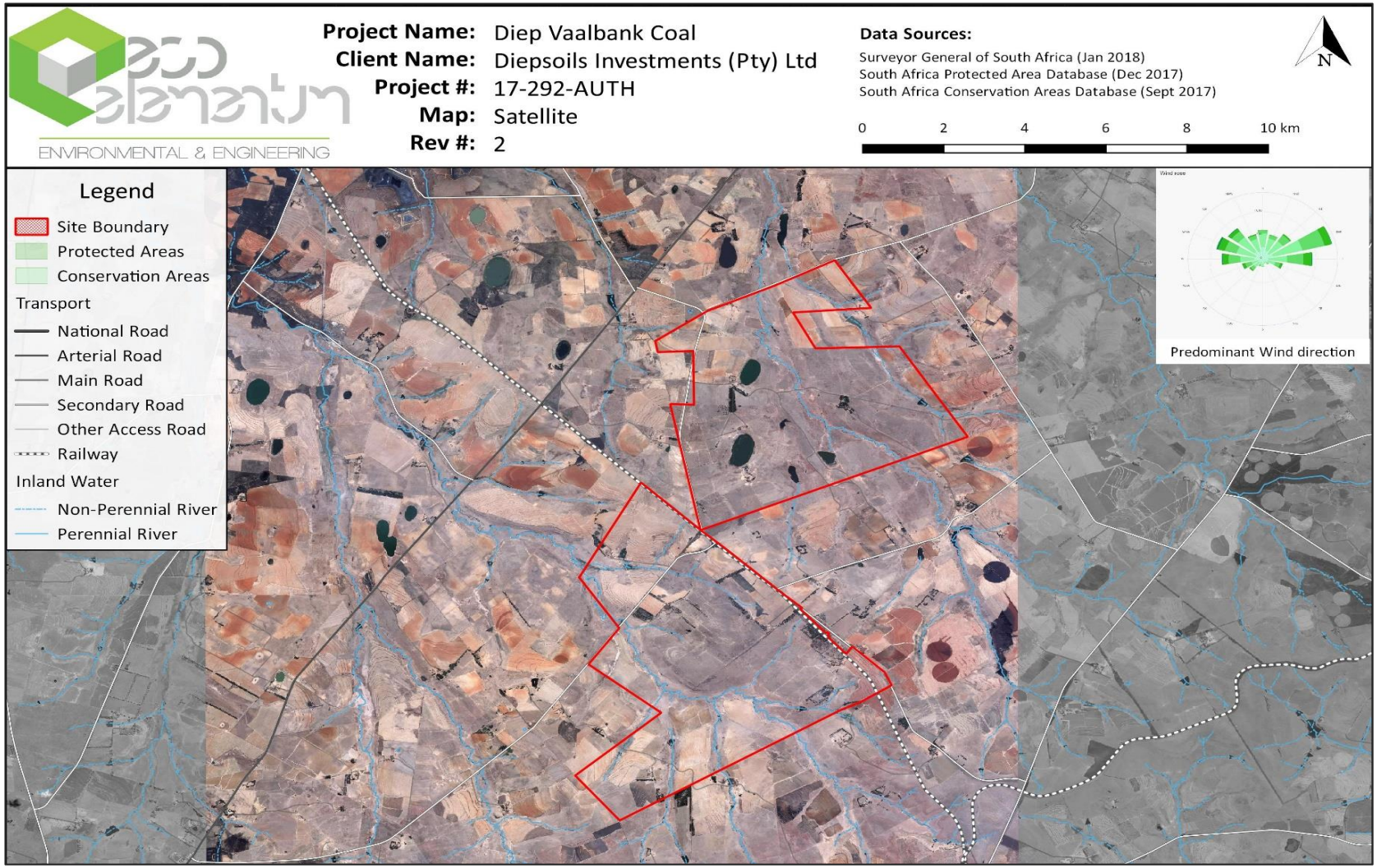

Figure 63: Locality Map with Satellite Imagery

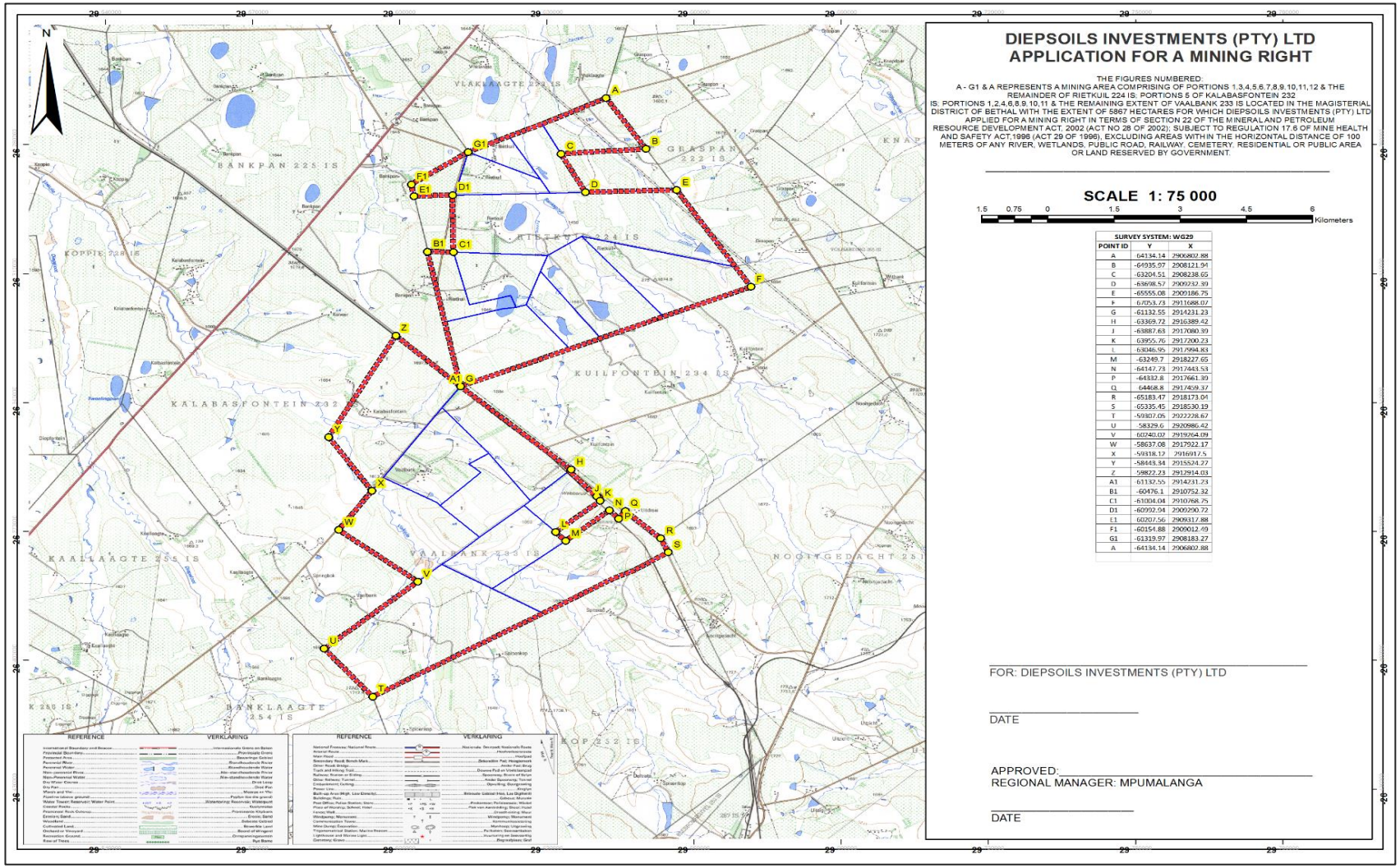

Figure 64: Regulation 2(2) Map

Map 3: Alternative 1 (Preferred) : Site Layout Vaalbank

Map 4: Alternative 2 Site Layout – Rietkuil

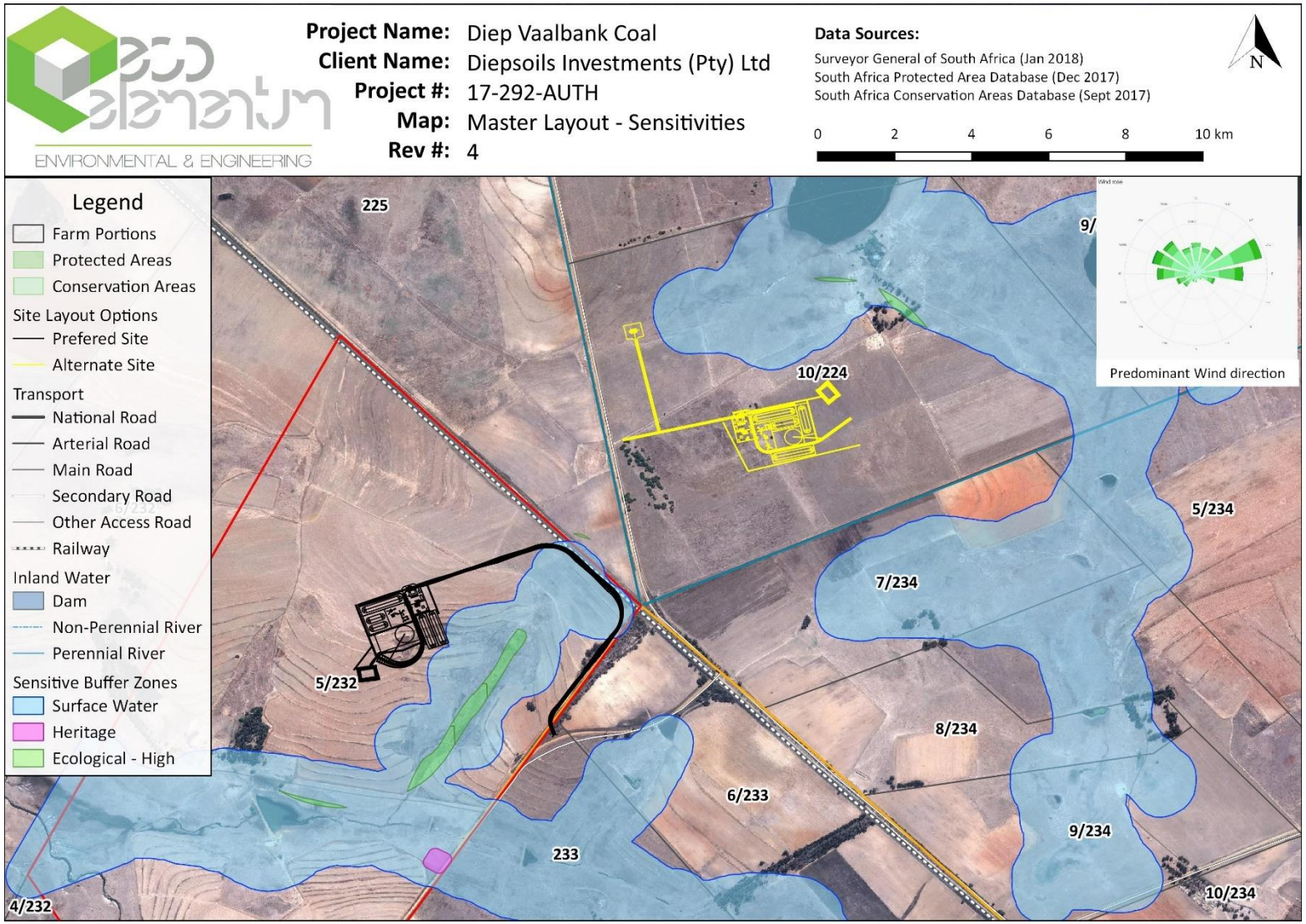

Figure 65: Alternatives 1 and 2 and Overall Sensitivity Map

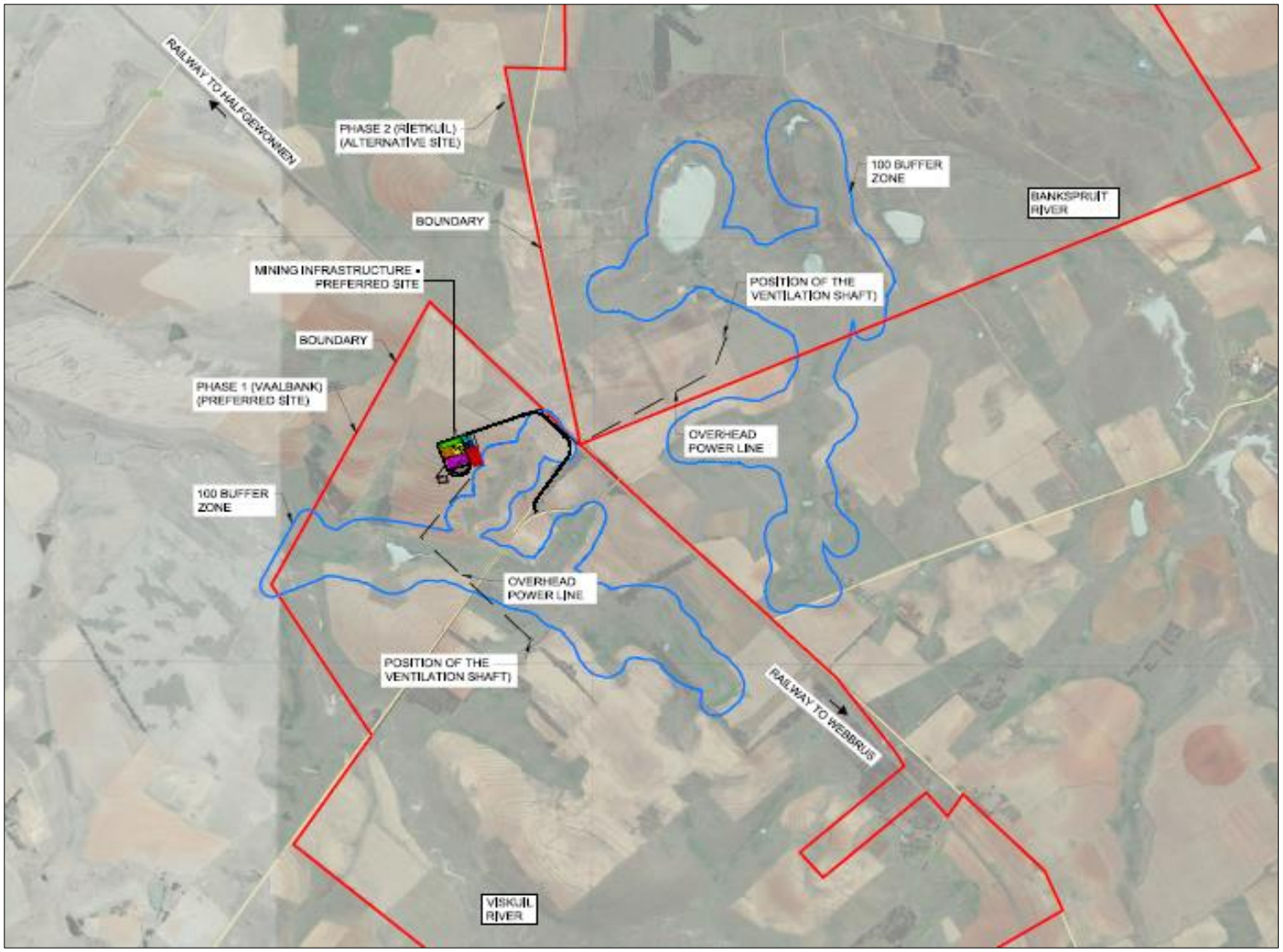

Figure 66: Close up of Alternatives 1 and 2 and associated Wetland Buffer

25.1 Description Of The Activities To Be Undertaken

25.1.1 Project Overview

- Mineral: Coal
- Mining Method: Underground board-&-pillar
- Depth of mining: Average depth between 40 m – 146 m below surface
- Air vents: Two ventilation shafts required
- Life of Mine: >10 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.

25.1.2 Mineral Reserve

Located on the southern edge of the Witbank Coalfield. In the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic levels.

▪ 5 Seam; ▪ **4A Seam;** ▪ **4 Seam;** ▪ 3 Seam; ▪ **2 Seam;** ▪ 1 Seam

The dominant seams are Seam No.2 with average thickness of 1.00m, Seam No. 4 with an average thickness of 2.03m and Seam No. 5 with an average thickness of 0.80m. The coal seams are relatively shallow, less than 150m below surface

25.1.3 Marketing Strategy

The market strategy and analysis for the mine was conducted by the applicant in consultation with Nurizon Consulting Engineers. The analysis was based on current market projections and on preliminary discussions with various potential clients. Nurizon states that given the size and quality of the reserve, the proposed Coal Mine should target primarily export markets as a RB1 quality. Coal pricing, as a commodity, is driven by supply and demand, with the export prices as at June 2017 was approximately US$77.37/t and at then prevailing exchange rates of R13.17/US$, this translated to R1018/t Free On Board at the Richards Bay Coal Terminal. These are the prices which have been used in that evaluation and are used in the economic Refer to Annexure 6.

25.1.4 Mining Method

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).

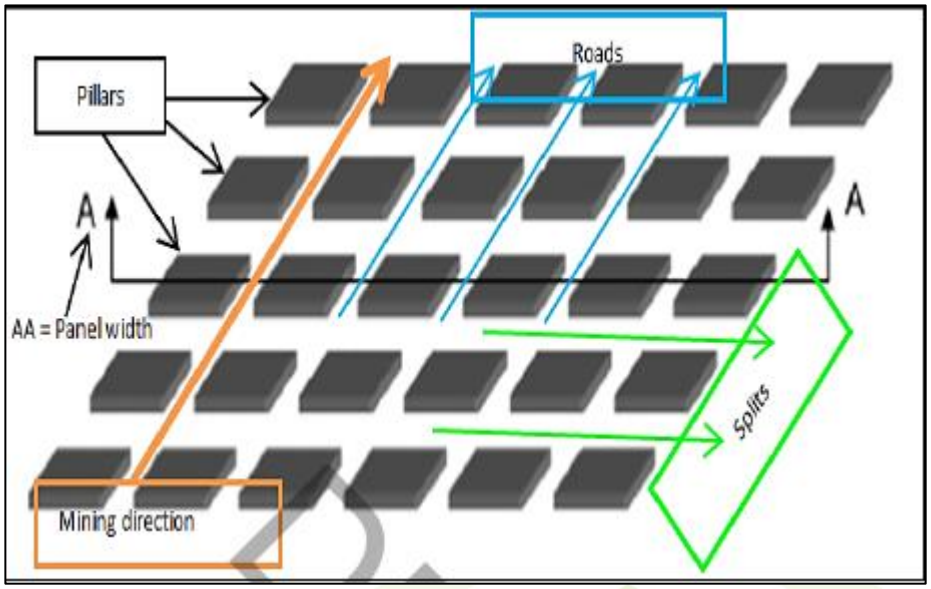

Figure 67: Underground board-&-pillar method Illustration

25.1.5 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.
- Storm water management infrastructure inclusive of pollution control dam.
- Underground water supply pipelines.
- Septic tank for sewage handling/Ablution facilities
- 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).

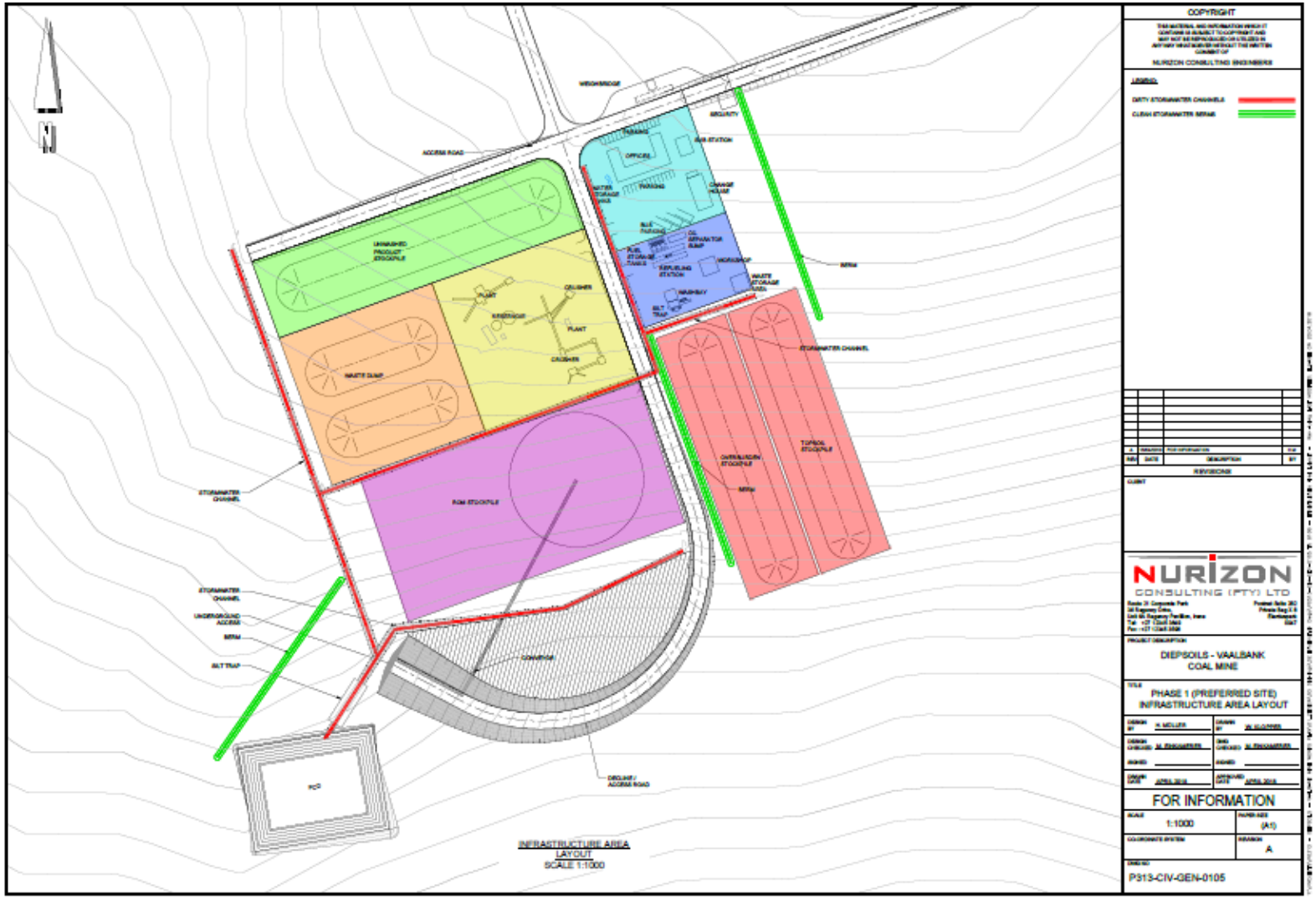

Figure 68: Preferred Alternative 1 Infrastructure Map (Kalabasfontein)

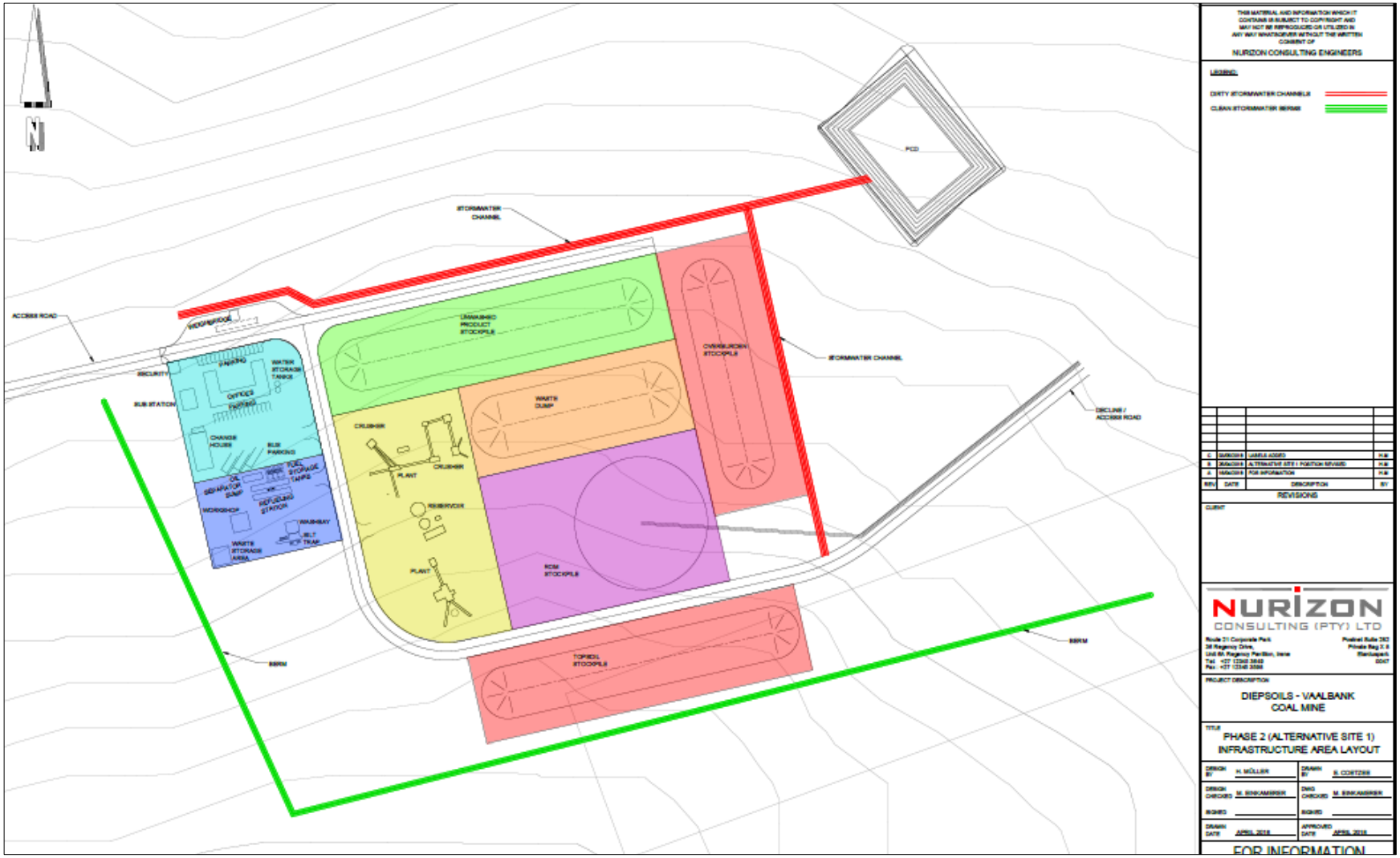

Figure 69: Alternative 2 Infrastructure Map (Rietkuil)

25.1.6 Water Management Infrastructure

The separation of clean and dirty water on site is crucial in reducing the negative impacts of mining activities on the receiving environment. Specific management principles are outlined in the National Water Act, 1998 (Regulation No. GN 77 also called GN 704). All dirty water management facilities must be designed to cater for a 1:50 year storm event, as required by GN704 of NWA.

Reinforced concrete stormwater channels will be constructed. The purpose of these channels is to collect all the stormwater from the infrastructure area and convey it to the Pollution Control Dam (PCD); • The water from the PCD will be re-used (wash water, fire water, dust suppression, etc.); Refer to Figure 17 for the storm water management infrastructure on site

25.1.6.1 Dirty Water Areas of the Mine and Pollution Management Infrastructure

Dirty water is defined as stormwater runoff from inside the operational area (or areas) where the water could have encountered a potential source of contamination, e.g. hydrocarbons. Water from such sources should be intercepted and stored in a **pollution** control dam (PCD) to form part of a closed system, whereby the water is recycled as far as feasibly possible for use in mine operational processes. The following areas of the operational have been identified as part of the dirty water catchment area:

Crusher/beneficiation plant	Internal haul roads
Product stockpiles (including Waste Rock)	Weighbridge
Coal loading platform	Groundwater ingress and rainfall intercepted within incline
Fuel storage area	

It has been assumed that groundwater seepage and stormwater ingress within the incline as well as underground will be pumped directly to the PCD (as required) serving as source of raw water to be used by the coal crusher/beneficiation plant.

25.1.6.2 Pollution Control Dam

The stormwater run-off for the infrastructure area was calculated using the rational method. Based on the information, a PCD volume of 9,779m3 (including 800mm freeboard) is required. The PCD barrier design was carried out in accordance with regulation 36784. The proposed barrier is a class C barrier that is required for the Type 3 material in terms of Regulation 634 and 635.

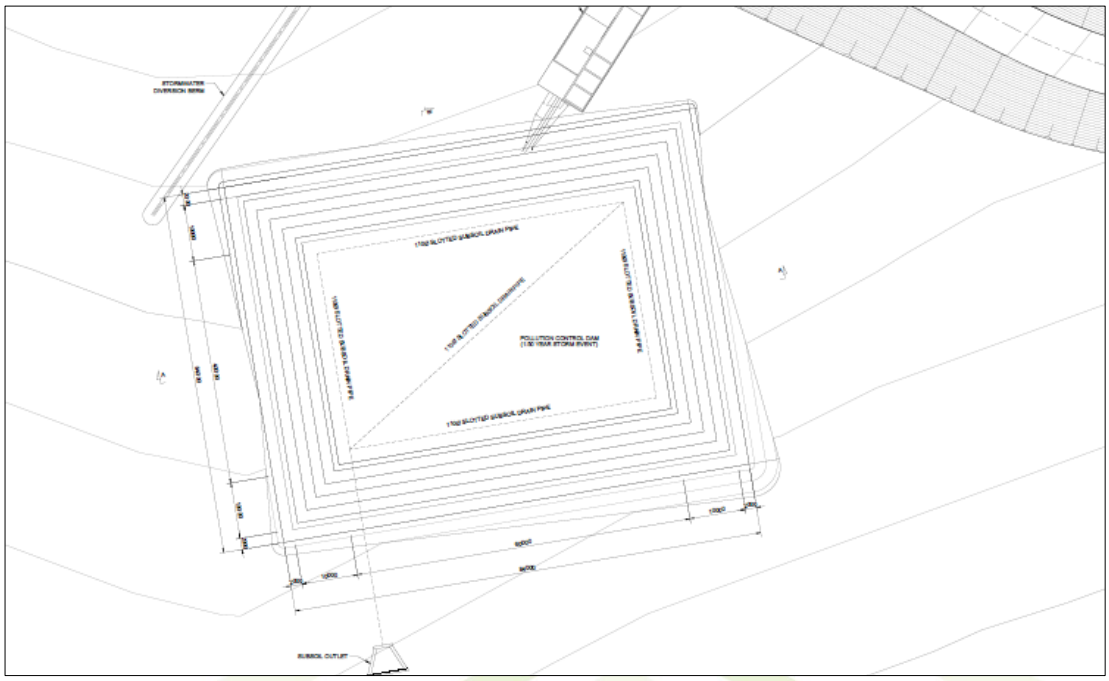

Figure 70: Proposed PCD Layout

The PCD will be lined with a 1.5mm HDPE liner, placed on a geotextile (Bidim A4 or similar) (refer to Figure 9-3). The HDPE liner will have a maintenance free life of 5 years. After this period routine inspections and maintenance will need to be undertaken on in order to ensure the performance of the liners

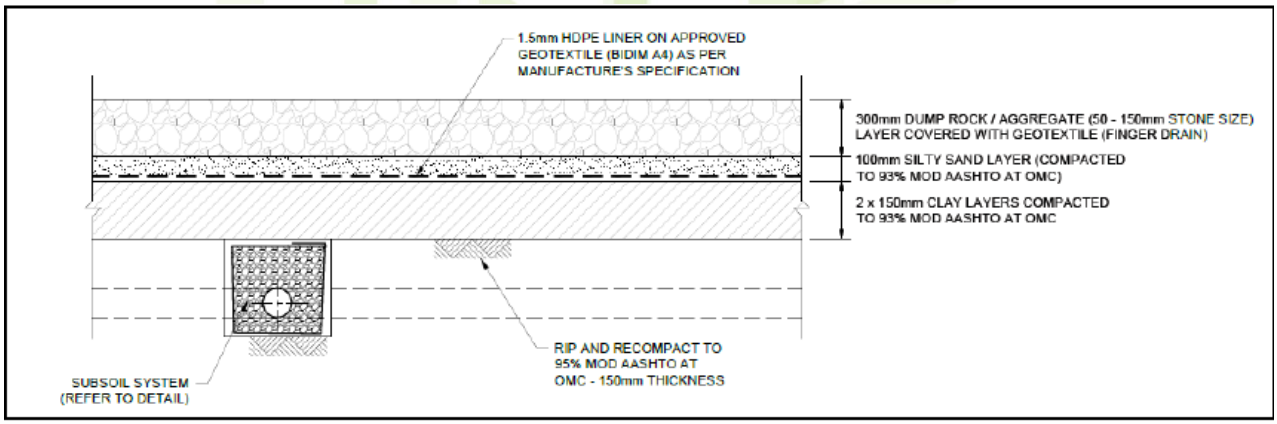

Figure 71: PCD Liner Details

25.1.6.3 Clean Water Areas of the Mine

Clean water is defined as stormwater runoff from areas which fall outside operational areas and are not contaminated by plant process. A mine's clean water management system should wherever possible, be separated from the closed dirty system if it is to be discharged into a natural watercourse.

Stormwater run-off within identified 'clean' catchments will be intercepted by diversion channels and/or earth berms which divert away from the project area, to be discharged into existing watercourses. In an effort to limit the impact of the proposed mining activities on

the existing water resources in the area, clean stormwater runoff from the majority of the area will be diverted towards the Olifants River. The following is planned in this regard:

- Earth (unlined) channels
- Lined channels (for high velocity flows and scour protection)
- Earth berms (alongside platforms in cut)
- Toe drains (along the toe-line of platforms)
- Clean water culverts for road and railway crossings

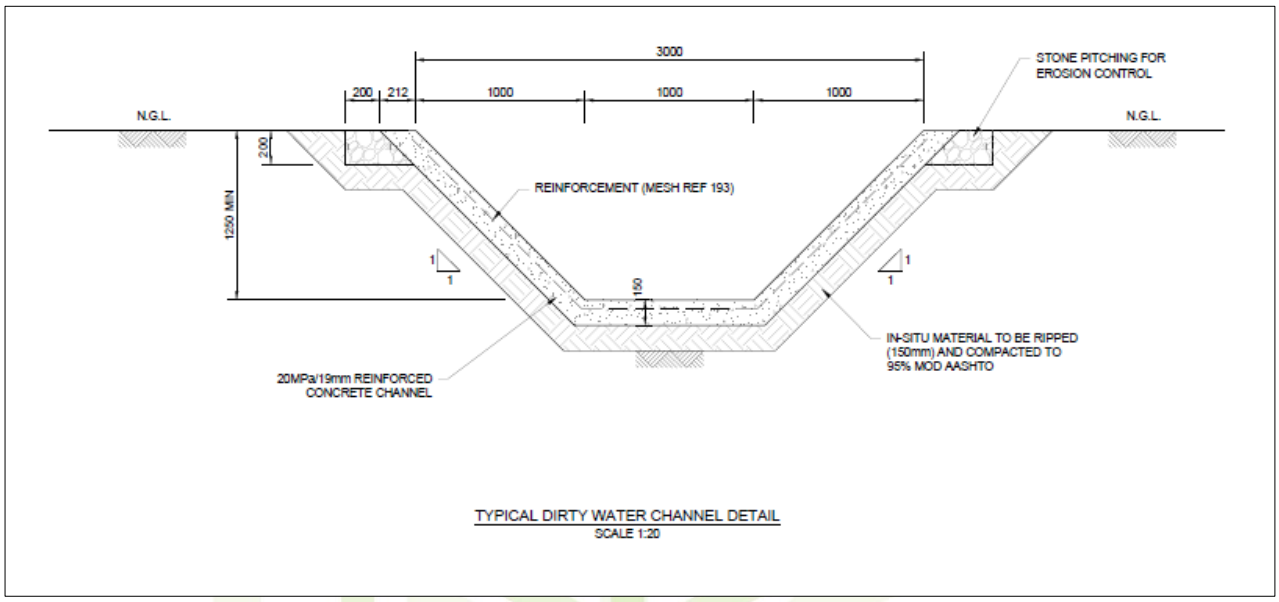

Figure 72: Proposed Dirty Water Channel Cross Section

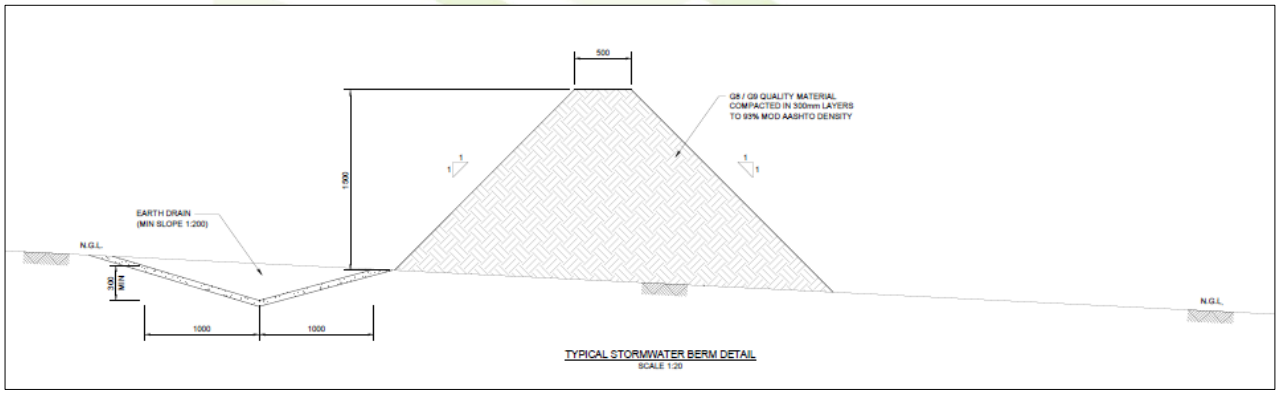

Figure 73: Typical Stormwater Berm Cross Section

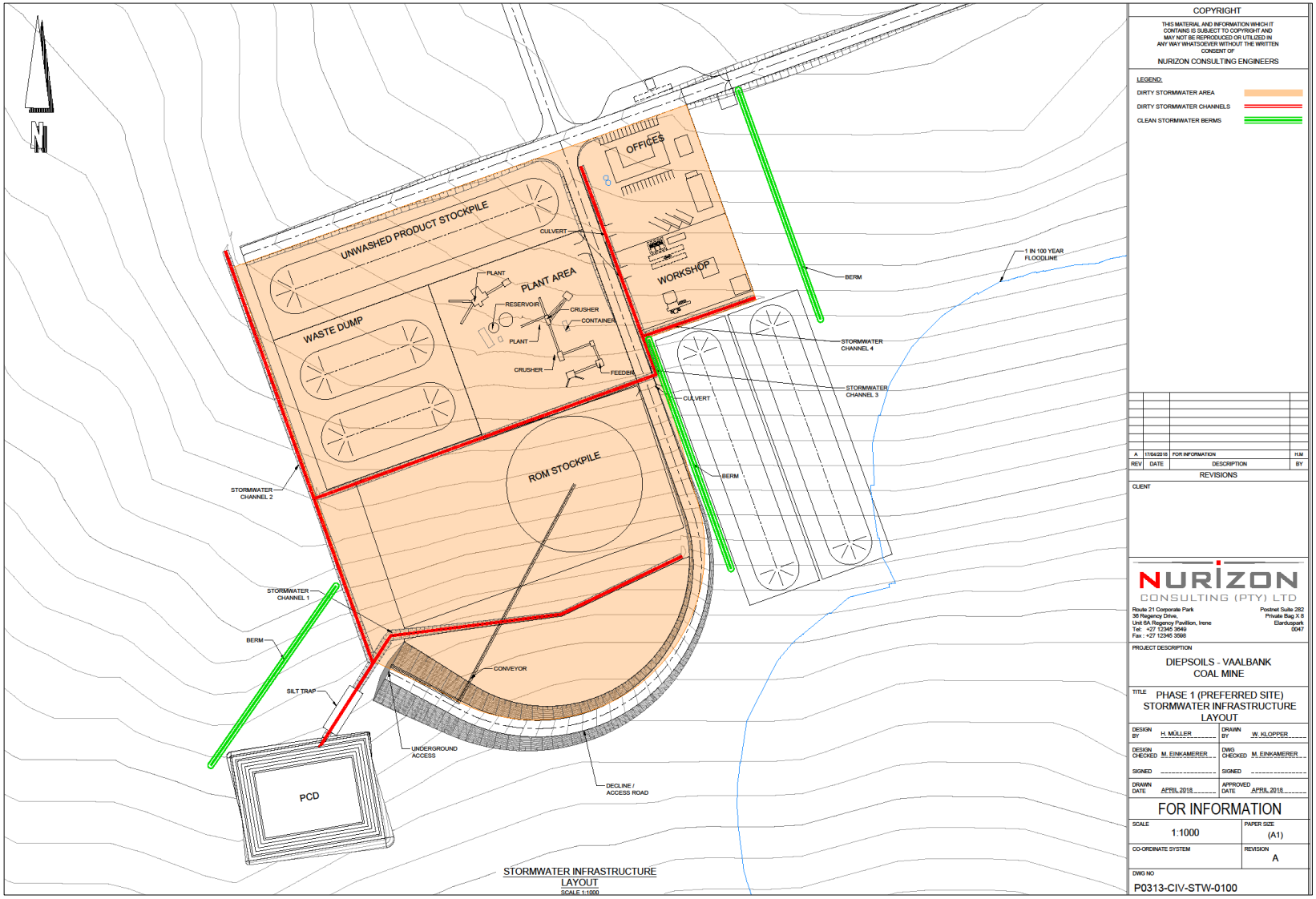

Figure 74: Stormwater Infrastructure

25.1.7 Main Mining Infrastructure

The process of the proposed Diep Vaalbank Coal mining project is provided below.

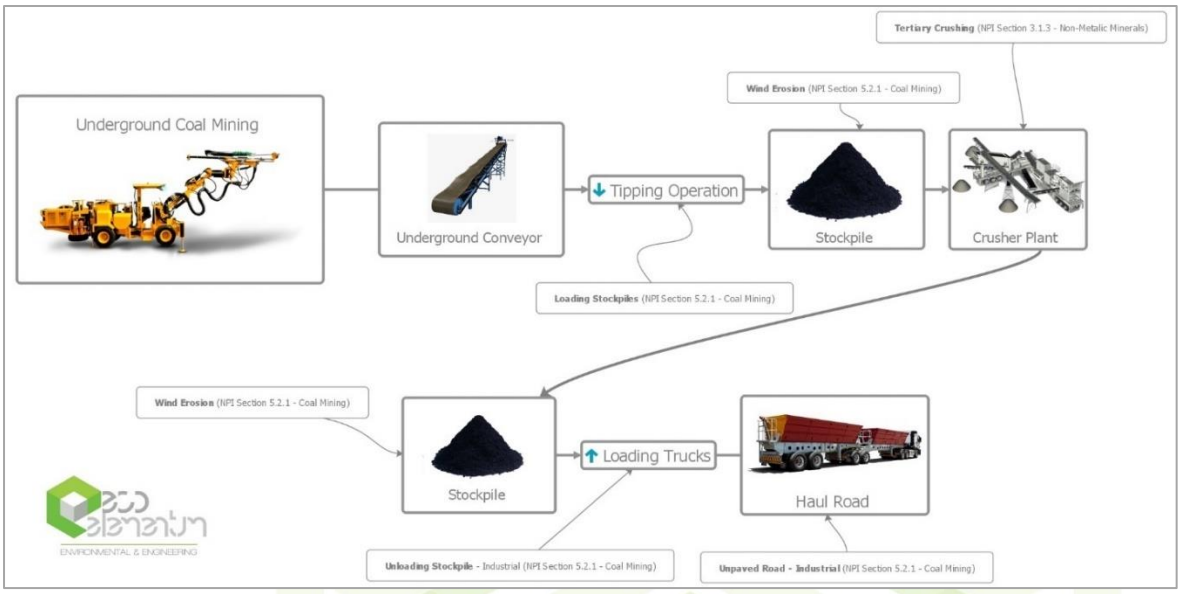

Figure 75: Mining Process Illustration

25.1.7.1 Ventilation Shaft

Ventilation to seam 4 would initially be provided via the decline shaft. Later in the life of the mine, both up and down cast ventilation shafts would be required to allow for sufficient air flow and to provide adequate ventilation throughout the mine workings to create a safe working environment. It was found that a total off two ventilation shafts would be adequate

25.1.7.2 . Decline Shaft

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).

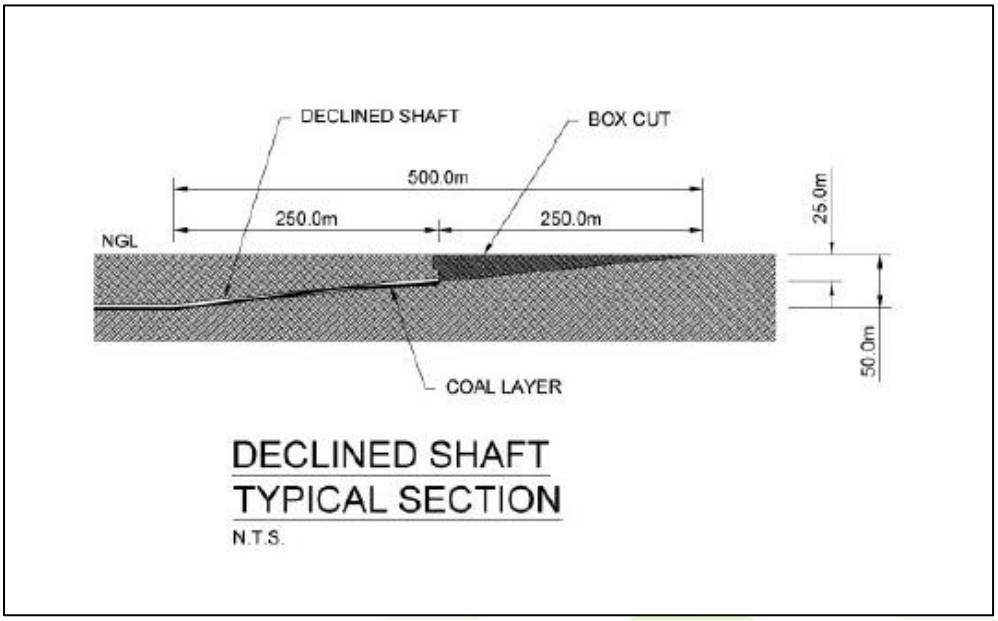

Figure 76: Typical Declined Shaft Section

25.1.7.3 Coal and Rock Handling

The coal will be conveyed from the underground works to surface via a flame-retardant conveyor. The main conveyor width is 1 500 mm with the section conveyor 1 200 mm wide. From the coal face, the coal is transported to the conveyor tail end via shuttle cars and dumped into a feeder breaker. The coal is broken down from 150 mm to 75 mm before transportation to surface.

25.1.7.4 Crushing and Screening

The blasted coal will be loaded and hauled to the ROM coal stockpile, from where the coal will be initially sent to the crushing and screening plant before being hauled via road to the markets

25.1.7.5 Mine Residue Disposal

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.

25.1.7.6 Stockpiles

Any overburden material extracted will be stockpiled and used to rehabilitate the incline shafts once mining is completed.

25.1.7.7 Personnel Transport

Production teams are transported underground to the designated waiting places in non-flameproof underground busses and shift supervisors and maintenance crews use non-flameproof double cab light duty vehicles (“LDV”) for inspection, repairs and maintenance.

No personnel transport vehicle will be permitted to travel closer than 180m from the working face. Only approved roadways, equipped with continuous environmental atmospheric electronic surveillances, may be used by these vehicles.

25.1.8 Auxiliary Mining Infrastructure

25.1.8.1 Offices, Workshops and Wash bays

The mine area will be fenced off and access to site controlled. Supporting infrastructure will include:

- Security and access control (permanent security house and boom gates will be constructed at the Mine entrance. The structures will comprise of brick and mortar and will be supplied with electricity from a diesel driven generator.)
- Weighbridge (An area adjacent to the security has been identified for the weighbridge and will require limited cut and fill prior to installation. An accredited weighbridge will be installed by contractors.
- Offices (The contractor will provide 3 mobile offices of 4 x 10m)
- Ablution Facilities - An area has been identified between the security and contractors camp area for ablution facilities.
- Laboratory, clinic and training facilities
- Lamp room, change house and ablution facilities
- Stores and Material
- Workshops, wash bay, and contractors yard
- Bunded fuel storage facility and re-fuelling station; and
- Temporary storage waste yard (general, scrap and hazardous waste).
- Parking and truck wait area
- Underground water supply pipelines;
- 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;

25.1.8.2 Water Supply

Potable water will be supplied from a borehole located near to the contractor's yard. Water for dust suppression will be sourced from the water containment dam.

25.1.8.3 Power Supply

Eskom power will be utilised with a dedicated off take point on existing Eskom infrastructure

25.1.8.4 Access Roads

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. The number of trucks that will be added to the existing road network will peak in year 4. This will be approximately 28 trucks per night and day shift respectively, translating to one interlink every 26 minutes.

The mine access road was designed as a 9m wide gravel road with a design speed of 60km/h. All the horizontal curves are larger than the required 110m with super elevation introduced on the curves. The K-values for the vertical alignment are all larger than the required 16 for crest and sag curves with a minimum curve length of 100m used. The road follows the existing farm roads to the north next to the Trasnet railroad reserve *(which runs between Halfgewonnen – west and Webruss towards the south east)* and farm road on the south eastern side. The route was chosen to reduce the footprint as far as possible within the 1 in 100 flood line area. The tie-in with the existing gravel road is shown in Figure 20. The traffic will then follow the existing gravel road towards the north where it will access the R38.

The intersection with the existing gravel road is located on the outside of the existing horizontal curve which allows for the required sight distances. The intersection has bell mouths with a radius of 12m that will allow for the design vehicles turning movements. The levels of the access road were designed in such a way that the intersection does not require and adjustment to the existing gravel road's alignment or levels.

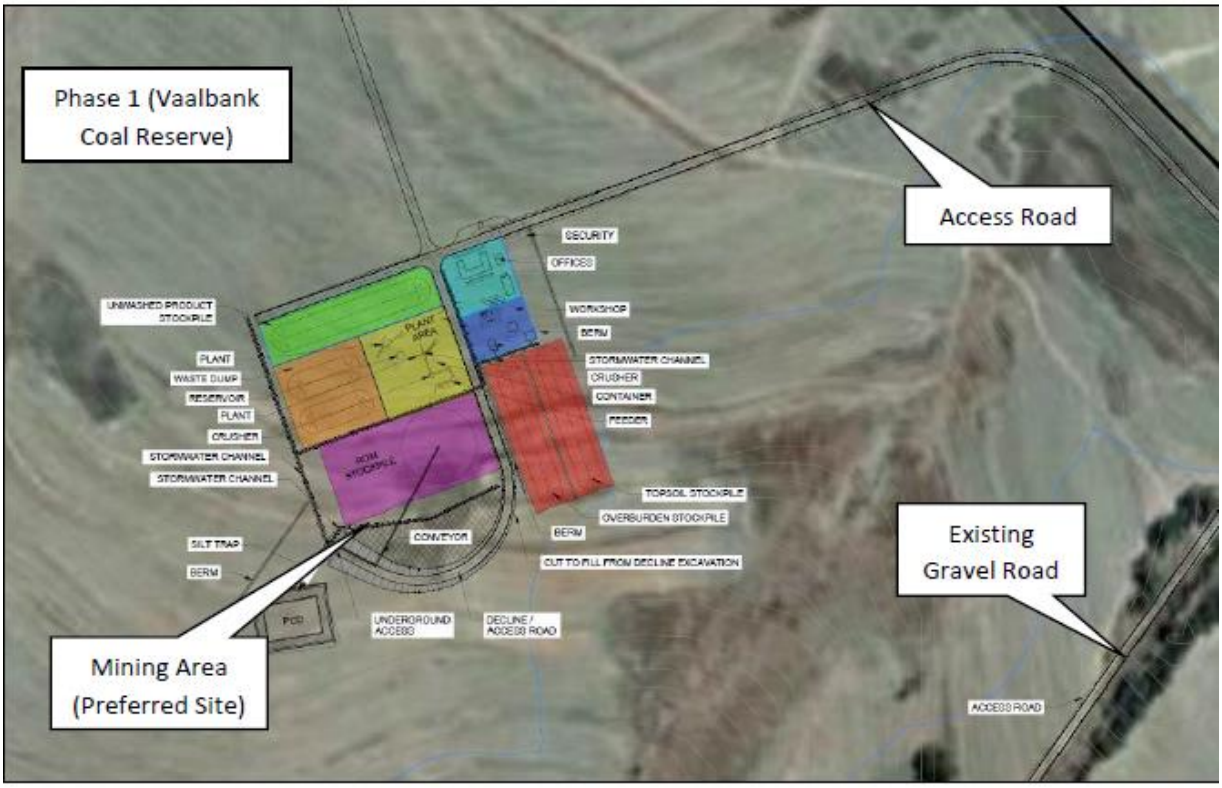

Figure 77: Proposed Access Road

25.1.8.5 Transport of Final Product

Coal will be trucked to market. Sixty (60) tonne payload trucks are envisaged to deal with the total coal hauling capability

25.1.8.6 Waste Management

General and hazardous waste will be generated on site:

- General waste includes office and domestic waste; construction and building waste; scrap metal; old tyres and conveyor belts; and wood.
- Hazardous waste includes mine residue; used hydrocarbons; contaminated construction, building waste and sewerage (septic tanks and package treatment plant

All waste will be separated and stored as per the relevant Norms and Standards where and when relevant. Mine residue will be disposed of at the integrated discard dump and will be managed according to GNR632 (2015) of NEM: WA regarding planning and management of residue stockpiles and deposits.

25.1.8.7 Diesel Storage

Hydrocarbon storage (max.80 m^3) will be constructed at the workshop area, within a concrete bund. The bunded area will be able to accommodate at least 110% of the stored volume.

25.1.9 Employment Requirements

Preference will be given to local employment structures and suppliers if the mine is approved. It has been calculated that one hundred and twenty (120) employees will be employed during the LOM

26. COMPOSITE MAP

Please see Final Mine Plan, as well as the Environmental Sensitivity Plan. Copies of the plan have also been attached in A3 format - Annexure 2.

Figure 78: Final Site Map (Alternative 1)

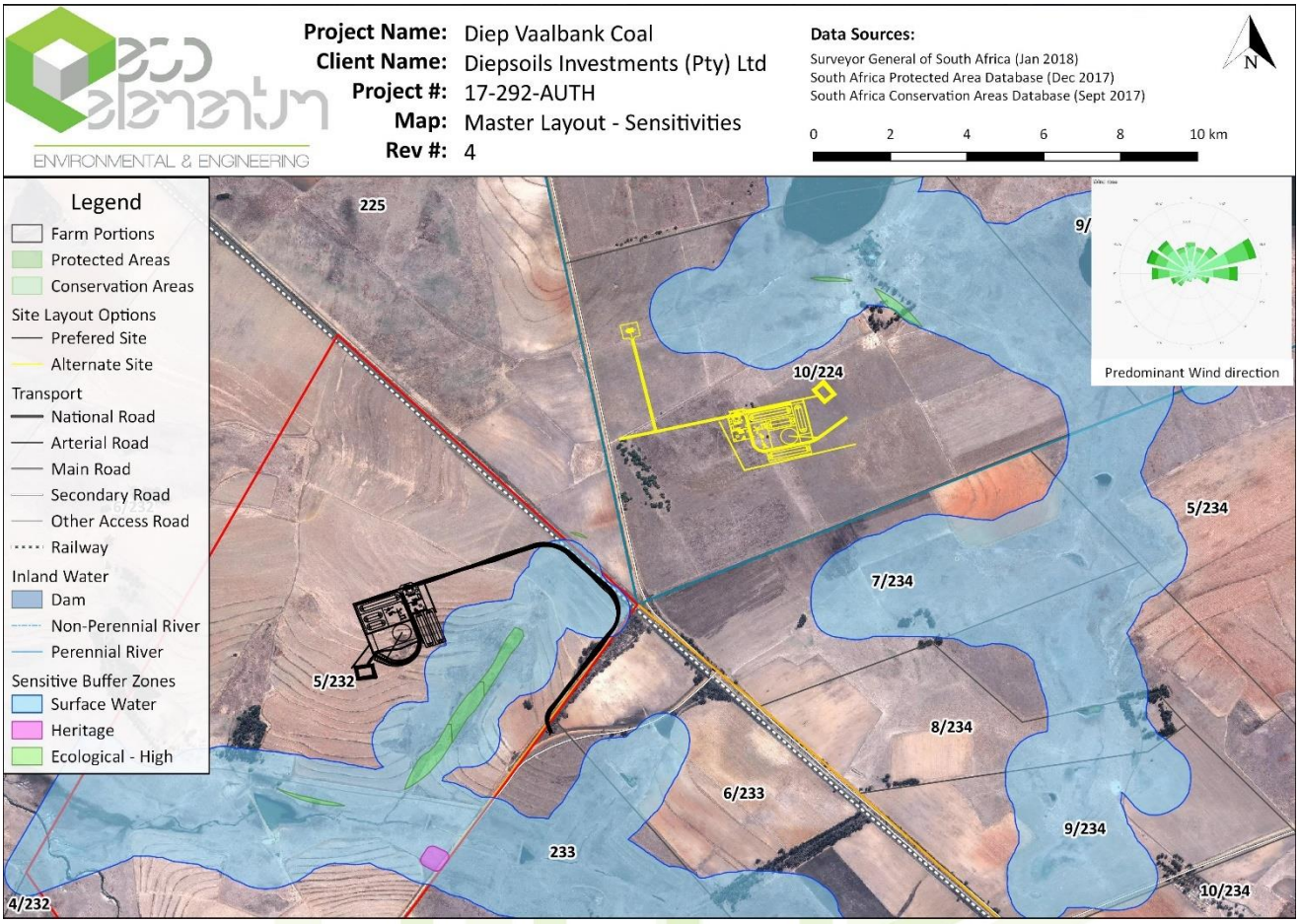

Figure 79: Environmental Sensitivity Map

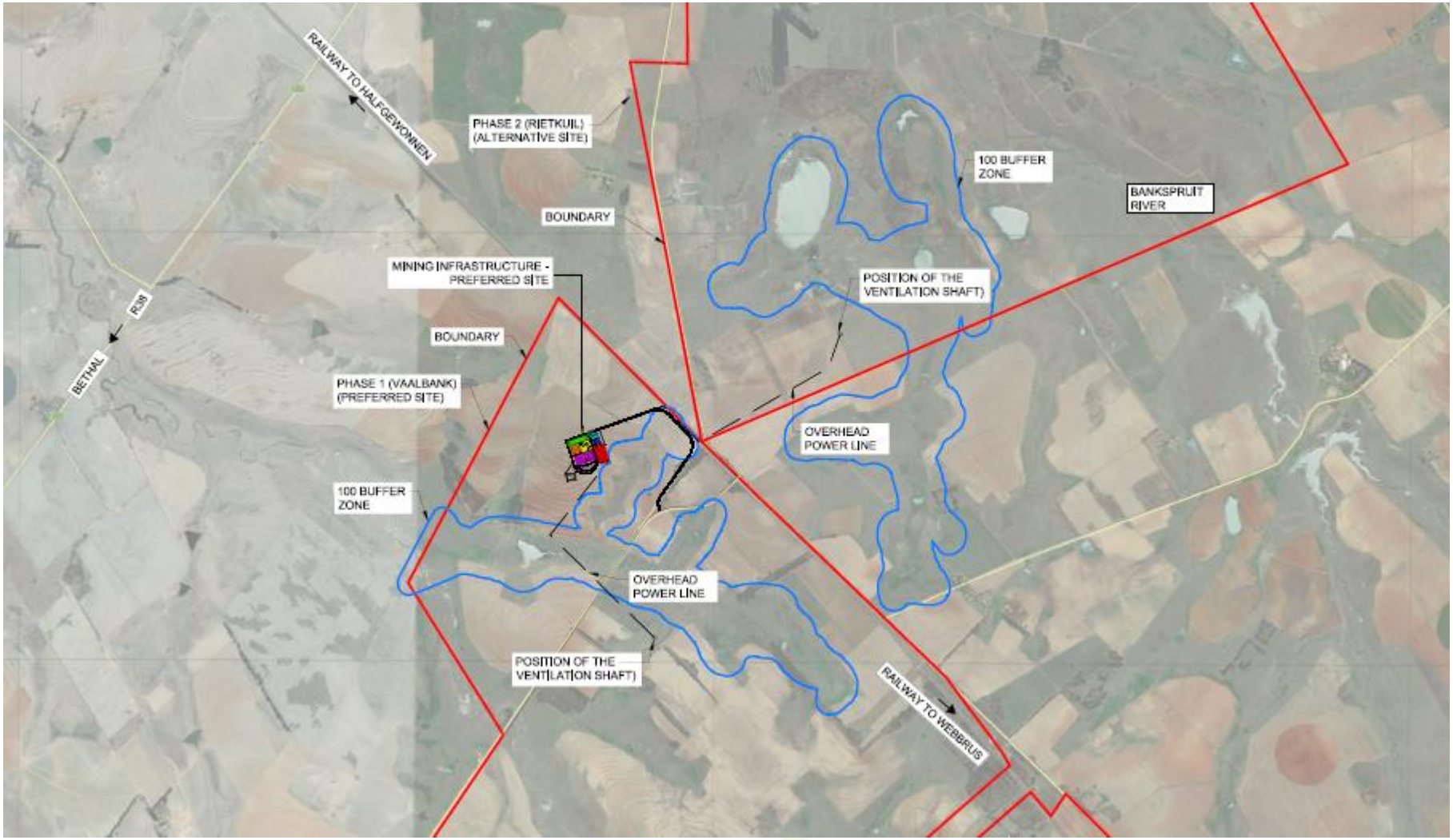

Figure 80: Final Site Map 2 (Alternative 1)

27. DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

27.1 Determination Of Closure Objectives

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts, assess their significance and implement appropriate mitigation and management measures to either avoid, minimise and/or remediate the associated impacts where they cannot completely be avoided.
- Implement an adequate monitoring programme to:
    - Ensure that mitigation and management measure are effective.
    - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
    - Reduce duration of any potential negative impacts.

Please refer to Table 41 for the management measures identified.

27.2 The Process For Managing Any Environmental Impacts

The management plan is detailed below for each aspect during each mining phase. Some measures are relevant to more than one aspect. These are not reiterated for each aspect.

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.

27.3 Potential Risk Of 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.

27.3.1 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 43: 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 44: 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

27.3.3 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.

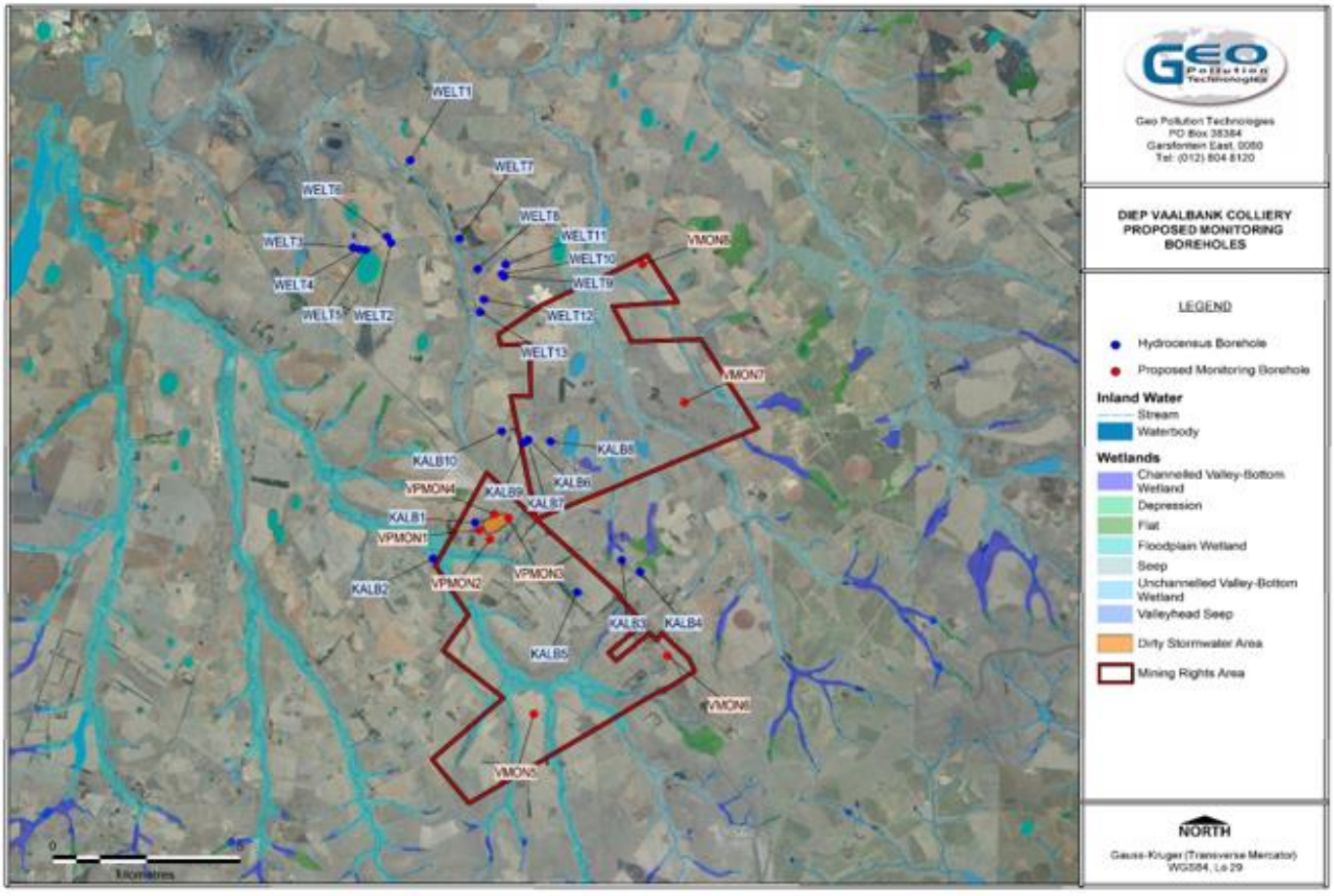

Table 45: Proposed Groundwater Monitoring Boreholes

27.4 Volumes And Rate Of Water Use Required For The Mining Operation

A detailed mine water balance must still be undertaken.

27.4.1 A Has A Water Use Licence Has Been Applied For?

A WULA will be submitted once the Final Layout is approved. Pre-application meetings have however taken place with the DWS.

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27.5 Impacts To Be Mitigated In Their Respective Phases

Refer to Annexure 10 for a full assessment and mitigation measures

The full impact assessment table with associated mitigation and management measures are presented in Annexure 10.

27.6 Specialist Impact Management Recommendations

The following specialist recommendations have been applied to all phases of the project in order to mitigate the identified impacts.

Table 46: Specialist Impact Management Recommendations

Specialist Report	Specialist Recommendation
Diep Vaalbank Coal Air Quality Assessment Report (Eco Elementum, 2018).	• It is recommended that ambient air quality monitoring be established to get a baseline condition prior to onset of the operations and to establish the level at which the proposed operations are noted to impact on the ambient air quality. • Fallout monitoring should be continued for the life of mine to better assess the level of nuisance dust associated with both mining and process related operations. Sampling of fallout should be undertaken within the neighbouring areas as well as on-site. • Dust fallout monitoring should ideally be located on-site, at the crusher and in the vicinity of major material handling points and on next to any sensitive receptor areas located downwind from the emissions sources. • Indicative PM10 and PM2.5 dust monitoring must be undertaken at the same sites as indicated under the previous bullet and in and around potential fugitive emission sources to determine mitigation measures and focus management efforts. • The most significant impacts for the proposed development includes the crushing and screening facility, haul roads and material handling. • The mitigation and management measures discussed in this report should be sufficient to ensure the mining operation can be conducted with minimal impact on the receiving environment and therefore not have a detrimental effect.
Visual Impact Assessment (Eco Elementum, 2018)	• Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered. • Primary measures that will be implemented will mainly be measures that will minimise the visual impact by softening the visibility of the structures by "blending" with the surrounding areas. Such measures will include rehabilitation of the mining area by re-vegetation of the mining site and surrounding area. • Secondary measures designed to specifically address the remaining negative effects of the final development proposals. • Secondary measures will include final rehabilitation, after care and maintenance of the vegetation and to ensure that the final landform is maintained. • In addition, the following measures are recommended: o Plant some indigenous trees to create a barrier between the neighbours and roads; o Dust from Stockpile areas, roads and other activities must be managed by means of dust suppression to prevent excessive dust; o A wind barrier system that encloses the stockpiles and tailing dumps; o Stockpiles and waste rock dumps should not exceed 20m in height; and o Rehabilitation of the area must be done as the mining is completed.
Soil, land use, land capability and agricultural potential study for the Diep Vaalbank Coal project, Mpumalanga (Rossouw Associated, 2018)	• A Soil Management Plan (for all phases of the mine) must be in place prior to construction commencing. • The following objections should be described in the SMP: 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.

Construction Phase Mitigation measures

- Minimise the surface disturbance footprint
- All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined
- Management and supervision of construction teams: The activities of construction contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site.
- In addition, compliance to these instructions must be monitored.

- **Stockpile Locations**:
  Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.

- **Demarcation of topsoil stockpiles:**
  To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum
- **Stockpiling of topsoil:**
  Ensure all topsoil stockpiles are clearly and permanently demarcated and located in defined no-go areas.

- **Prevention of stockpile contamination:**
  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.

- **Management of the terrain for stability**
  - 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 and service road management**
  - 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.
  - 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.
  - The side drains on the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used.

- **Prevention of soil contamination (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.

Operational Phase Mitigation measures

- **General Soil Management**

- It is recommended that concurrent rehabilitation techniques be followed to prevent topsoil from being stockpiled too long and losing its inherent fertility but opportunities may be limited by the layout of the operation
- As new stockpiles are created, they should be re-vegetated immediately to prevent erosion and resulting soil losses from these stockpiles
- 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).
- 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.
- Routine monitoring will be required in and around the sites.

- **Prevention of soil contamination**
  - Stockpiles are 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 stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. 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, are contained and appropriate means provided for treating and disposing of liquids and solids;
  - Air pollution control systems avoid release of fines to the ground (such as dust from dust collectors or slurry from scrubbing systems);
  - Solids and slurries are disposed of in a manner consistent with the nature of the material and avoids contamination; and
  - Effluent and processing drainage systems avoid leakage to ground

Closure and Decommissioning Phase Mitigation measures

- **General Soil Management**
  - The activities of decommissioning contractors or employees will be restricted to the planned areas. Instructions must be included in contracts that will restrict decommissioning workers to the areas demarcated for decommissioning. In addition, compliance to these instructions must be monitored.
  - All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site.
  - 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.
  - 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. The vegetative cover reduces erosion potential, slows down runoff velocities, physically binds soil with roots and reduces water loss through evapotranspiration. Indigenous species will be used for the re-vegetation, the exact species will be chosen based on research available and then experience as the further areas are re-vegetated

- **Prevention of soil contamination**
  - 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.
Groundwater impact study- (Geo Pollution Technologies,2018)	**<u>Construction Phase</u>** **(*Objective 1: Prevention of hydrocarbon leakage)*** • It must be ensured that a credible company removes used oil after vehicle servicing • A sufficient supply of absorbent fibre should be kept at the site to contain accidental spills • Remove or remediate areas of hydrocarbon contaminated soils by following a risk based approach, take action if a negative risk is found. A risk assessment should be conducted by a qualified hydrogeologist **<u>Operational Phase</u>** ***(Objective 1: Minimize the impact of dewatering of aquifer and loss of groundwater flow)*** • Store all potential sources in secure facilities with appropriate storm water management, ensuring contaminants are not released into the environment. ***(Objective 2: The minimise the impact of leachate from contaminant sources such as stockpiles, PCD's etc)*** • Monitor static groundwater levels on a quarterly basis in all boreholes within a zone of one kilometre surrounding the mines to ensure that any deviation of the groundwater flow from the idealised predictions is detected in time and can be reached on appropriately. • If it can be proven that the mines are indeed affecting the quantity of groundwater available to certain users, the affected parties should be compensated. This may be done through the installation of additional boreholes for water supply purposes, or an alternative water supply. ***(Objective 3: To minimize Rebound & Decant)*** • The numerical model should be updated during operation of the mines by using the measured inflows, water levels and drilling and pump test information to re-calibrate and refine the impact prediction **<u>Decommissioning Phase</u>** ***(Objective 1: To minimize leachate from contaminant sources such as stockpiles, PCD's etc)*** • Monitor static groundwater levels on a quarterly basis in all boreholes within a zone of one kilometre surrounding the mines to ensure that any deviation of the groundwater flow from the idealised predictions is detected in time and can be reacted on appropriately. • Apply best practice mining methods, where possible remove contaminant sources • Develop a closure management plan for groundwater management • The numerical model should be updated during closure of the mines by using the measured inflows, water levels and drilling and pump test information to re-calibrate and refine the impact prediction • The final backfilled void topography should be engineered such that runoff is directed away from the opencast areas. • Treatment of the decant may be viable, however all passive methods should be investigated first during the operational phase of the mine • Major fractures encountered while mining must be sealed by grouting, both on inflow and outflow areas
Aquatic Ecological Study (Menco, 2018)	• Bio-monitoring must be done on a bi-annual basis to ensure more accurate results for season variability between dry and wet season conditions.

	• Surface water should be monitored on a bi-annual basis to successfully relate the change in habitat conditions to that of the water quality. Surface water monitoring and bio-monitoring should continue once the mining operations have started. • Establish a data basis which contains the monitoring and bio-monitoring data from the current and future assessments. • Apply for a Water use Licence once long term databases has been established for surface water. • With the current health class having a C rating it is important that the mine maintain this health class as this is also the health class currently expected for the catchment. • Protect and rehabilitate wetland areas to ensure that the current integrity and functions are maintained, as well as removing alien vegetation within riparian zones and replacing it with endemic species. • It has been observed that the river systems within these regions are to a notable extent being diverted in to farm dams for extraction and irrigation purposes. It is thus important to track these activities and take note of effects that these activities might have on especially the flow conditions of tributary sites during the dry season conditions.
Wetland Delineation (Menco, 2018)	• A buffer zone of 100 m should be maintained at all wetlands associated with high risk areas for subsidence. These areas, as well as the buffers around them, should be excluded from the mine plan; • Undermined streams and the required stability of pillars in proposed working areas needs to be determined and monitored; • Rock pillar safety factors as proposed in a rock mechanic report should be implemented and maintained; • The state of the wetlands and any subsidence in the mining area needs to be monitored by applying appropriate technology; • Wetland monitoring to be conducted annually
Ecological Assessment Report (Ecoelementum, 2018)	• Ecological buffers proposed (100m from the wetland areas should be adhered to and be excluded from the mining footprint) • The existing stand of Eucalyptus trees at Vaalbank must be retained and not removed as it will aid in dust management, visual effects and soil management. • Minimise the surface disturbance footprint • All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined • It is important that all staff and contractors are made aware of the fact that animals do occur on the site and that it is made very clear that animals are not to be harmed, captured, trapped or disturbed during construction and operations • The natural vegetation within the proposed area where the development will take place will be totally destroyed; it is recommended that large trees are marked prior to clearing to ensure they are not damaged. • All topsoil should be stored separately from other spoil in order to be used as final cover after rehabilitation. • A biodiversity baseline assessment should be conducted and form the basis of a Biodiversity Action Plan (BAP). The BAP should include a biodiversity management plan that states the protocol for concurrent mine rehabilitation and the frequency of monitoring • Any important species such as red data plants and animals, medicinal plants, protected species and any endemic species found on site during site layout, should be listed and their location recorded in order to remove these species prior to any development. • An alien invasive monitoring, eradication and control Programme is mandatory • Traps should preferably be set prior to construction in order to catch and relocate any species of conservation concern. • All necessary permits should be obtained from the relevant Authorities, prior to removal of any plants. • 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. • Management plan for the control of invasive and exotic plant species need to be implemented. Specialist advice should be used in this regard and should be budgeted for. This should include pre-treatment, initial treatment and follow-up treatment. The cleared areas should be re-vegetated with indigenous naturally occurring species to decrease large patches of bare soil. Closure will not be provided if mitigation of alien invasive species was not adhered to. • Rehabilitation should take place concurrently. 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. A report should be written and stored to be made available and should be available at all times. • The monitoring of biodiversity should include the following: o Seasonal visual assessment of areas to determine if vegetation in undisturbed areas is being impacted. o 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. o Continue with alien invasive monitoring, eradication and control programme. o 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.
A Phase 1 Archaeological Impact Assessment (Tobias Coetzee, 2018)	• 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. • Should Alternative 2 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. • Because the settlement remains falling within the area marked as 'Sensitive' on **Error! Reference source not found.** are 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. • .
Paleontological Impact Assessment Phase 1 Field Study (Dr Heidi Fourie, 2018)	• There is some concern with the project due to the presence of the Vryheid Formation. All the Alternatives will be situated on the Vryheid Formation. The depth of the Formation can be verified with geological cores. The topsoil, subsoil and overburden must be surveyed for fossils and Mitigation is needed for the shale layer if fossils are present. • Should further fossil material be discovered during the course of the development (e. g. during bedrock excavations), this must be safeguarded, where feasible in situ, and reported to a palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (e. g. Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample.

	• A Phase 2 Paleontological Mitigation is only required if the Phase 1 Palaeontological Assessment identified a fossiliferous formation or surface fossils or if fossils are found during construction or mining. Fossils were not found during the walk through. • Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment and adjacent areas as well as for safety and security reasons.
Noise Impact Assessment (Eco Elementum, 2018)	• 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 • 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.
Blast and Vibration Impact Assessment (Blast Management & Consulting,2018)	• It is recommended that a standard blasting time is fixed and blasting notice boards setup at various routes around the project area that will inform the community of blasting dates and times. • 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.
Socio-Economic Impact Assessment Report (Gibb, 2018)	• In order to soften the social and economic change related to the proposed mining activities, the following is recommended: • Consider the establishment of a Community Monitoring Forum (CMF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The CMF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local councilors (within the SIZ), affected landowners and the contractor(s). • A comments and complaints register, accessible to members of public, should be implemented and maintained by the main contractor • In order to address any potential health impacts, it is advised that the applicant, along with the appointed contractor(s), devise and implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. All permanent employees should receive Health and Safety, including basic HIV/AIDS awareness training at the onset of their employment • Furthermore, the movement of construction workers on and off the site should be closely managed and monitored by the applicant. In this regard the necessary arrangements should be made for the housing and transport of temporary construction workers. Allowance should be made for workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks. • 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. • Adhere to the principles and objectives op the Social Labour Plan and monitor progress annually (performance review)
Final rehabilitation, decommissioning and mine closure plan (Eco Elementum,2018)	• The following closure criteria is relevant to the Closure Phase; o Ground and surface water: Compliance with the IWUL and supporting IWWMP o Aquatic ecosystems: Wetland and aquatic macro invertebrate populations at predefined locations using appropriate biomonitoring techniques o Air Quality: Compliance with the standards as per the National Environmental Management: Air Quality (Act 39 of 2004) and Dust Control Regulations o Soil Quality: Soil quality as assessed against the Norms and Standards to support Chapter 8 of NEM:WA o Land Capability: Land capability and productivity similar to or enhanced from that which existed prior to mining o Erosion: Implementation or construction of erosion control measures o Safety / stability: The site is safe for use by humans and animals, also focusing on the foreseeable future o Vegetation: Establishment of self-sustaining vegetation populations which stabilizes soils and is not invasive to the region • Adhere to DWS' Best Practice Guideline (BPG5): Water Management Aspects for Mine Closure guidelines regarding the rehabilitation strategy: o Management measures at closure should primarily be of a passive nature with minimal long-term maintenance and operating costs. o The final landform must be sustainable, must be free draining, must minimise erosion and avoid ponding. o 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. o 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; o Biodiversity plan will address issues that are interrelated with the mine water management plan, particularly with regard to the environmental water balance and the effects that mining may have thereon. • Annual reports will be prepared to document the results of the monitoring during the rehabilitation, decommissioning, closure and post-closure phases • The applicant must ensure the necessary provision is made for the closure liability calculated associated with the project through the purchase of a Bank Guarantee as allowed by the Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, with the Bank Guarantee provided to the DMR following authorisation of the project.

Attach copies of Specialist Reports as Appendices (Annexure 6)

28. IMPACT MANAGEMENT OUTCOMES

SOIL MANAGEMENT:

- Minimise the surface disturbance footprint o
- Management of access and service roads
- Prevention of soil contamination
- Prevention of stockpile contamination
- Terrain Stability
- Implementation and monitoring of the Soil Management Plan
- Ensure post-mining land capability is at least similar to pre-mining which is grazing and some arable lands

VISUAL IMPACT MANAGEMENT:

- Creation of a visual barrier
- Concurrent Rehabilitation

NOISE MANAGEMENT

- Barriers (in the form of a berm between the noise source and sensitive noise receptor, as close to the noise source as possible.
- Quarterly ambient noise monitoring throughout the LOM prior to construction commencing.
- Adequate PPE given to staff exposed to high noise levels
- Machinery is kept in good condition

SURFACE WATER MANAGEMENT

- Improve the water quality of the stream
- Determine any changes in the current Health Class and also determine if any potential external sources have a potential impact on the Mines water resources.
- Control through monthly surface water monitoring;
- Avoid water resources to ensure no impact
- Maintain PES and EIS of the wetland system as stipulated in the Reserve for the catchment
- Compliance with the conditions of the section 21(c) and (i) water use authorisation
- Implement Wetland Rehabilitation to comply with REC for the impacted wetland
- No mining activity within the footprint of the delineated wetlands with protective buffer zone (100m)
- Compliance to the NWA Standards and License conditions
- Continues monitoring and reporting of results

GROUNDWATER MANAGEMENT

- Prevention of hydrocarbon groundwater contamination
- Management of groundwater inflows & prevention of contamination
- Compliance to the NWA Standards and License conditions
- Continues monitoring and reporting of results

AIR QUALITY MANAGEMENT

- PM10 and PM2.5 dust monitoring through the LOM
- Air quality monitoring network and reporting of results
- Compliance to the AQA
- No complaints from surrounding land owners

ECOLOGICAL IMPACT MANAGEMENT

- Implementation of a Biodiversity Action Plan (BAP)
- Minimisation of the project footprint
- Monitoring of ecological status by way of the BAP
- Integrity of natural system to be sustained
- Concurrent rehabilitation

HERITAGE AND ARCHAEOLOGICAL IMPACT MANAGEMENT

- Avoid sensitive area during construction and development phases
- Report on any archaeological or palaeontological finds

28.1 FINANCIAL PROVISION

28.1.1 Determination of the Amount of Financial Provision

28.1.1.1 Describe the Closure Objectives and the Extent to Which These Are Aligned To the Baseline Environment

- Refer to the Final rehabilitation, decommissioning and mine closure plan attached as Annexure 8

28.1.1.2 Confirm That the Environmental Objectives In Relation To Closure Have Been Consulted With Landowner And I&APS

- Refer to the final rehabilitation, decommissioning and mine closure plan attached as Annexure 8.

28.1.1.3 Rehabilitation Plan to Attain Closure Objectives Including Proposed Post-Mining Land Capability and Land Use

- Refer to the final rehabilitation, decommissioning and mine closure plan attached as Annexure 8.

28.1.1.4 Quantum of the Financial Provision Required To Manage and Rehabilitate the Environment

Refer to the risk impact assessment section above for both alternatives.

Table 47: Calculation of Mine Quantum

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] Multipliction 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		R 495 456,71
					6% of Sub Total 1 if more than R100mil		
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

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.

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28.2 Impact Management Actions

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 48: 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

29. MONITORING OF IMPACT MANAGEMENT ACTIONS

The table below details the monitoring details, including: Monitoring and reporting frequency; Responsible persons; Time period for implementing impact management actions; and Mechanism for monitoring compliance: Also refer to Annexure 10 for detailed management and monitoring measures

Table 49: Proposed 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, Noise and Vibration	Photographic records should be maintained together with findings, follow up actions and close out records as part of the Environmental Management System.

Annual reports will be prepared to document the results of the monitoring during the rehabilitation, decommissioning, closure and post-closure phases. These reports will provide important information required to manage the on-going closure activities, with the data and reports being used to:

- Provide recommendations for improving subsequent rehabilitation activities;
- Indicate where rehabilitation and closure activities have not been successful, requiring a potential change in design criteria or alternative interventions;
- Provide information where aftercare and maintenance is required during the post-closure period; and
- Indicate if relinquishment criteria have been met.

30. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT

All information as required by the various Government Departments should be captured and be readily available for submission when required and also for review by the external consultant conducting the performance assessment and audits.

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.

Table 50: Mechanisms to Monitor 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 IWUL
Construction, Operation and Decommissioning Activities	Water Quantity	Water Balance to be Updated Annually Flow Meter Reading and Update of Datasheet	SHEQ/ Engineering	Monthly as per IWUL
Construction, Operation and Decommissioning Activities	Bio-Monitoring	SASS 5 and IHAS Sampling Sites are to be established upstream and downstream of all Potential Impact sources	Aquatic Ecologist	Bi-Annually or as stipulated by the IWUL
Construction, Operation and Decommissioning Activities	Storm Water Management	Visual Inspection Check the system for blockages and possible spillage areas	SHEQ/ Engineering	After heavy rainfall events
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	Monthly
Construction, Operation and Decommissioning Activities	Groundwater Levels	Depth metres 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

31. ENVIRONMENTAL AWARENESS PLAN

31.1 Manner In Which The Applicant Intends To Inform Employees Of 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.

Table 51: 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	Immediately	Plant Manager

	contain run-off water. Monitor the spillway for erosion of the dam wall. If erosion occurs, reinforce the wall with sandbags.		
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. 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	Immediately	Environmental Management Representative

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

32. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

All information committed to in the scoping report and as requested by the DMR to date has been incorporated in the EIA/EMPr.

- A3 size locality map is included in Annexure 2.

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34. LIST OF ANNEXURES

- Annexure 1 - Qualifications of the EAP
- Annexure 2 - Environmental Assessment Practitioner CV
- Annexure 3 - Locality Maps
- Annexure 4 - Site Layout and Infrastructure
- Annexure 5 - Public Participation Process
- Annexure 6 - Specialist Studies
- Annexure 7 – Social aand Labour Plan
- Annexure 8 – Closure and Rehabilitation Plan
- Annexure 9 – Mine Works Programme Report
- Annexure 10 – Impact Assessment Tables
- Annexure 11 – DMR Correspondence

35. UNDERTAKING

The EAP herewith confirms

a. The correctness of the information provided in the reports ☒
b. The inclusion of comments and inputs from stakeholders and I&APs ; ☒
c. The inclusion of inputs and recommendations from the specialist reports where relevant; and ☒
d. The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

Signed: _____ 2018