ENVIRONMENTAL & ENGINEERING

REPORT

KLEINFONTEIN MINING HOLDINGS – KLEINFONTEIN COLLIERY (PTY) LTD SECTION 102 EMP AMENDMENT

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

REFERENCE NO: MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM, JICAMA MR - MP 30/5/1/2/2/318

PROPOSED AMENDMENT OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMP) FOR KLEINFONTEIN COLLIERY

10/09/2018

VERSION 0.0

DOCUMENT AND QUALITY CONTROL

Document No:	KLEINFONTEIN COLLIERY SECTION 102 EMP AMENDMENT: DRAFT EIA/EMP			
AA – draft	10/07/2018	Henno Engelbrecht		EAP First draft for review / comments
BB – draft	10/07/2018	Carene Kruger		External Review
CC– draft		Leoni le Roux		Quality review
Approved for Distribution:				
0.0	10/07/2018	Henno Engelbrecht		Final report

QUALITY CONTROL BY:

Nature of Signoff:	Responsible Person:	Role / Responsibility	Qualification
Author	Henno Engelbrecht	Senior Environmental Consultant / EAP	BSc Honn Environmental Management & Analysis MSc Project Management
Reviewer	Carene Kruger	External Technical Reviewer	BSc. (Hons) Geography (UJ) Certified Natural Scientist – Environmental Science (Reg :300176/150 IAIA Member (Reg-3046
Client	-	-	-

DISCLAIMER

DECLARATION OF INDEPENDANCE

I, Henno Engelbrecht 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.

10/07/2018

_____ _____

Signature **Date**

Mr. Henno Engelbrecht

Eco Elementum (Pty) Ltd – Director/ Senior Environmental Consultant

B.Sc. (Hons) Environmental Analysis and Management

MPM MSc: Project Management (UP)

EXECUTIVE SUMMARY

BACKGROUND

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) that Kleinfontein Mining Holdings proposes to amend their current approved EMPs (Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM, Jicama MR - MP 30/5/1/2/2/318 MR) in order to conduct additional open cast mining on their Kleinfontein Colliery properties.

Eco Elementum (Pty) Ltd has been appointed by Kleinfontein Colliery (Pty) Ltd to undertake the section 102 EMP Amendment and Integrated Water Use License Application for the Jicama opencast mining area to include various extensions of existing approved opencast mining blocks and related mining infrastructure required to mine the areas in a responsible manner while giving effect to environmental and water resource protection ensuring minimal impacts through effective management. During further invasive drilling and exploration activities on the Jicama mining area new geological information became available which resulted in the mining layouts to be altered to ensure optimal mining and utilisation of the available coal resources. This application therefore serves to seek approval for the revised mining layout. The total approved mining area of Kleinfontein Colliery is **2968,851** hectares (ha).

PURPOSE OF REPORT

This report constitutes the Draft EIA Report and is the first phase in the environmental assessment process before a decision is issued. The purpose of the Draft EIA Report is to assess key environmental issues that were raised during the Scoping Phase. The report therefore includes the outcome of the various specialist studies undertaken as part of the application and to provide Interested and Affected (I&AP's) with an opportunity to comment on the Report. The comments and inputs will subsequently be incorporated into the Final EIA Report which will submitted to the DMR for final decision making.

LOCATION

The current mining area comprises over 2,968.851 ha and is located within the Steve Tshwete Local Municipality (Nkangala District) and Govan Mbeki Local Municipality (Gert Sibande District Municipality) approximately 30 km south of the Middelburg, Mpumalanga Province.

Table 1: Land Description Table

MINING SECTION	LAND DESCRIPTION	TOTAL AREA (HA)	REGISTERED OWNER
JICAMA SECTION (318 MR)	Remaining extent of portion 1 of the farm Middelkraal 50 is,	685,2256	Umcebo Properties
	Remaining extent of portion 4 of the farm Middelkraal 50 is		Umcebo Properties
	Portion 14 (a portion of portion 3) of the farm Leeuwfontein no. 48 is	40,2570	Umcebo Properties
	Remaining extent of portion 4 of the farm I Leeuwfontein no. 48 is	128,4798	Umcebo Properties
	Remaining extent of portion 5 of the farm Leeuwfontein no. 48 is	279,9274	Umcebo Properties
	Portion 15 (a portion of portion 3) of the farm Leeuwfontein no. 48 is	40,2570	Umcebo Properties
	Portion 16 (a portion of portion 3) of the farm Leeuwfontein no. 48 is	59,9572	Umcebo Properties
	Portion 17 of the farm Leeuwfontein n no. 48 is,	8,5654	Ilanga Coal Mines (Pty) Ltd
	Portion 8 of farm Kleinfontein no. 49 is	818,3330	Anglo Coal Operations
	TOTAL AREA		**279,9274**
KLEINFONTEIN SECTION (17MR)	Portion 8 of the farm Kleinfontein 49 is	310,0732	Kleinfontein Collierty (Pty) Ltd
	Portion 2 of the farm Kleinfontein 49 is	481,2092	Umcebo Properties
	Remainder of the farm Kleinleeuwfontein 563 is	116,5687	BHP Billiton Coal South Africa
	TOTAL AREA		**1726,181**
TOTAL MINING RIGHT AREA			**2968,851**

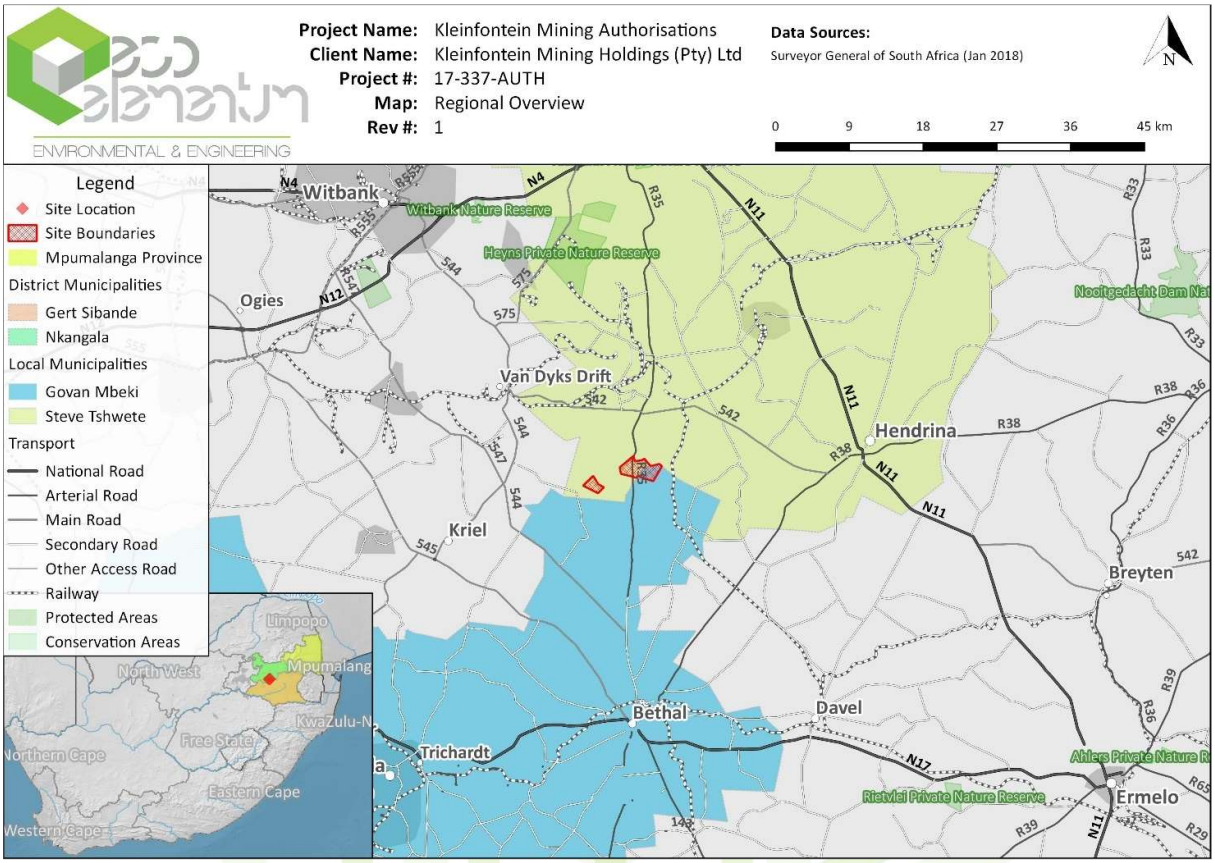

Figure 1: Locality Map

PROJECT DESCRIPTION

Kleinfontein Colliery (Pty) Ltd is located on the Mpumalanga Highveld in the Olifants River Catchment, on a number of properties and holds surface and/or mining rights on these properties. The total size of the properties on which Kleinfontein Colliery is located is 5 096 ha while Mining Rights are held over approximately 3 098ha of these properties. The boundaries and locations of these properties, with the applicable mine area sections are illustrated in the figure below.

Kleinfontein Colliery is situated on and has an approved EMP in respect of the following properties;

- Portion 8 of the farm Kleinfontein 49 IS
- A Portion of Portion 4 of the farm Kleinfontein 49 IS
- Portions 5, 14, 15, 16 and 17 of the farm Leeuwfontien 48 IS
- A Portion of Portion 18 of the farm Leeuwfontein 48 IS
- The Remaining Extent of Portion 1 of the Farm Middelkraal 50 IS; and
- Portion 4 of the Farm Middelkraal 50 IS

The existing Kleinfontein EMP and proposed Kleinfontein EMP Areas are illustrated in Figure 2 below.

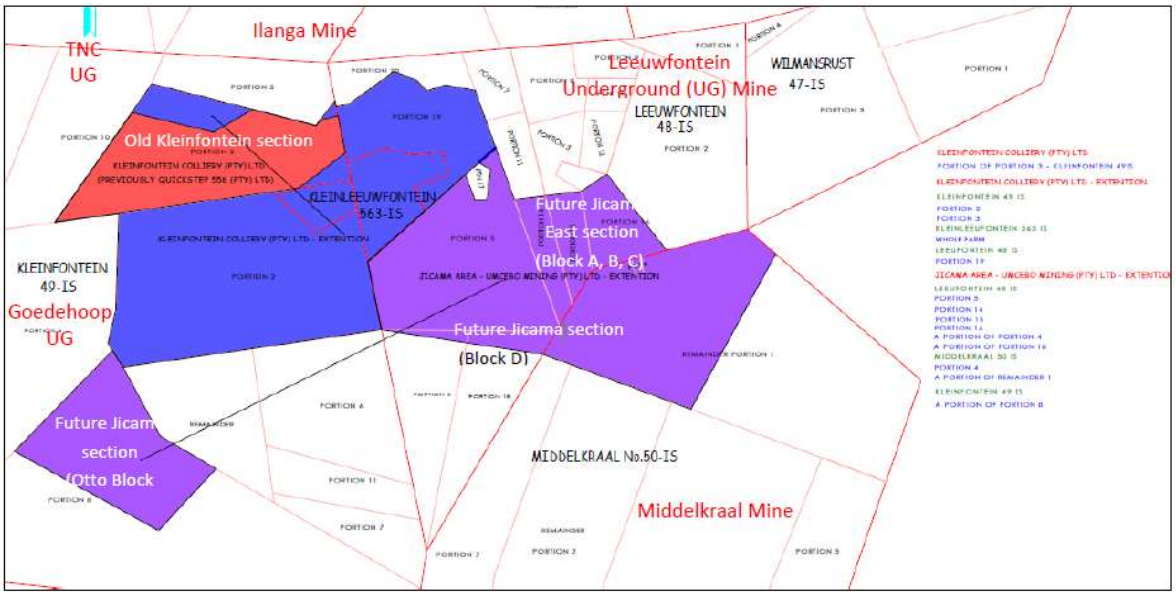

Figure 2: Overview of Kleinfontein Mine

The following image (Figure 3) indicates the Mining Right boundary in red with the historically approved Jicama opencast mining areas as per the existing EMP in white. The areas in green indicate the revised Jicama mining layout which is applicable to this EMP amendment which has changed as a result of new geological information which came available during an invasive drilling program. The following image indicates the detailed layout inclusive of stormwater management infrastructure.

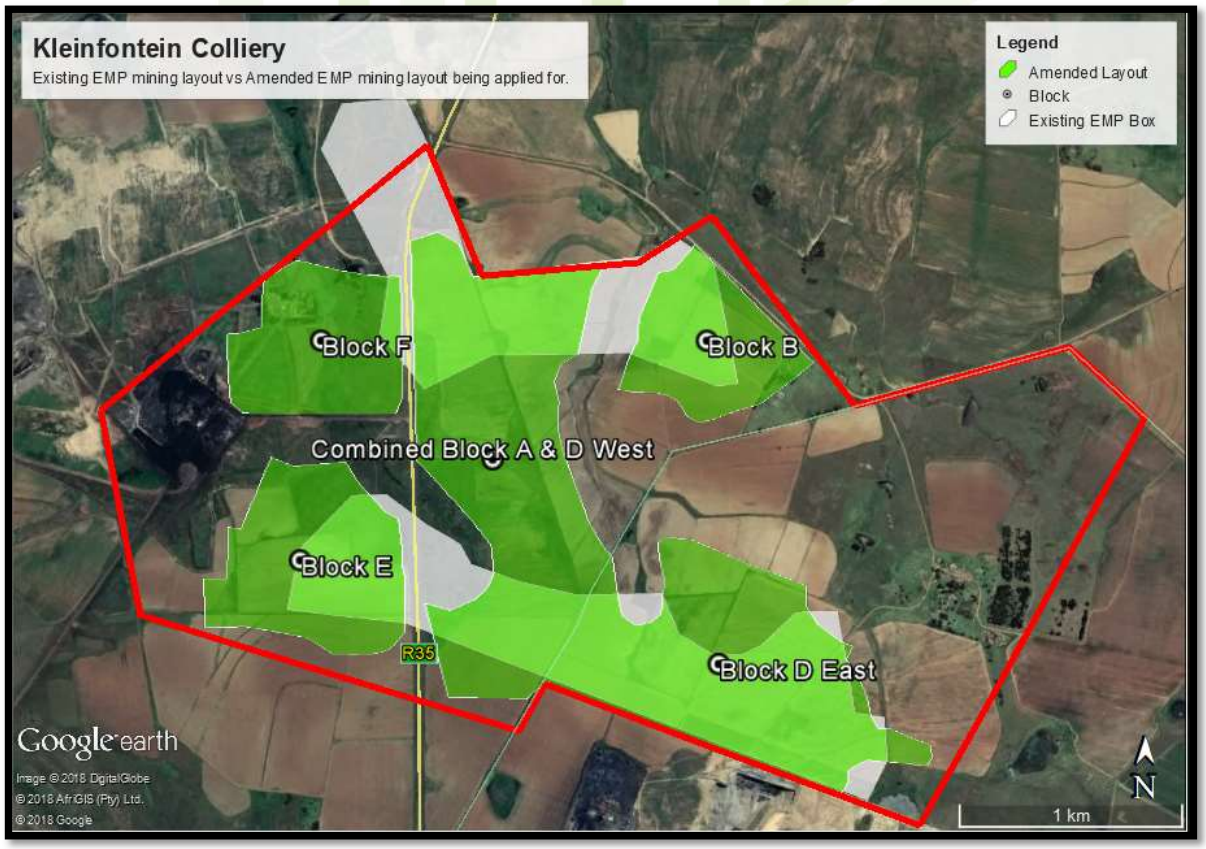

Figure 3: Existing and Proposed Kleinfontein EMP Areas

PROPOSED CHANGES AND AMENDMENTS TO THE EXISTING EMP:

The amendment of the current EMP will allow for the following:

- Implementation of new stormwater infrastructure (including. 5 x new Pollution Control Dams, pumps, pipes and trenches/berms) to ensure effective water management as per the National Water Act, 1998 (Regulation No. GN 77/GN 704)
- Additional open cast mining on the Kleinfontein Colliery properties – within the existing mining right area (namely seam 2 on the Jicama South Resource Block and 4U seam on Keaton 4 seam resource block situated to the west of the tar road and east of the tar road at Jicama Block 2).
- Various extensions of the approved mining layouts to include additional coal resources and reserves which has been discovered during further invasive drilling and core sampling on the boundaries of the approved opencast mining sections.
- Alignment of the existing approved EMPs with the newest NEMA EIA Regulations.
    - Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM
    - Jicama MR - MP 30/5/1/2/2/318 MR

LEGAL REQUIREMENTS

The intent to amend an approved EMP requires the following applications and subsequent approvals prior to commencement:

- Mining Right S102 Amendment (MPRDA): Section 102
- Environmental Authorisation: NEMA and EIA Regulations namely:
    - GNR 983/GNR327 - Activities13,15,27&30;
    - GNR 984/GNR325 - Activities 17
    - GNR 985 /GNR985- Activities 10,12,14
- Amended Integrated Water Use License: NWA
    - Section 21 water uses - 21(a),21(c), 21(i),21(g),21(j)

PROJECT SCHEDULE TO DATE

The project life is estimated at 10 years. The EA and waste management license (WML) are being sought for a period of 15 years.

DATE	ACTIVITY	LEGAL TIMEFRAME
01 December 2018	**Application lodged with DMR**	**44 days + 21 Days = 65 Days**
15 December 2017 – 05 January 2018	***December Holidays – excluded from legislated timeframe***	
05 January 2018 – 05 February 2018	Provide I&APs (including relevant State Departments) with the opportunity to review and comment on the Draft Scoping **(30 days PPP)**	
06 February 2018	Final Scoping Report submitted to DMR	**43 days + 21 Days = 64 Days**
15 March 2018	Final Scoping Report accepted by the DMR (not received by Ecoelementum due to faulty fax line)	
06 June 2018	Request for maximum allowable timeframe in order to complete EIA Report and conduct 30 days public participation	**106 days + 50 additional days = 156 (excluding public holidays) = (18 Aug 2018)**
18 June 2018	DMR Approval of maximum allowable timeframe (156 days from acceptance of Scoping)	
11 July 2018 2018-14 August 2018	Provide I&APs (including relevant State Departments) with the opportunity to review and comment on the Draft EIA Report (30 days PPP)	
07 August 2018	Expected Date for Submission of Final EIA Report for decision making	
15 August 2018	Last day for submission (156 days from 15 March 2018)	
30 November 2018 ***(is submitted on 15 August 2018)***	**DMR Decision on Final EIA Report Due**	**DMR Decision Making Process 107 Days**
-	Notify I&APs of decision and Opportunity to Appeal (21 September 2018 – 11 October 2018)	**Appeal Timeframe 20 Days**
-	Closure of Appeal Process	

KLEINFONTEIN MINING OVERVIEW AND PROCESS

- **Mineral**: Coal (Bituminous Coal). Possible Pseudocoal and Torbanite will be mined if encountered although unlikely.
- **Mining Method:** Opencast "Rollover Method" (concurrent backfilling and rehabilitation).
- **Depth of mineral below service:** Depth of the lower coal seams varies from 15 to 55 metres but could be up to 65 metres in isolated areas.

- **Geological Formation:** Coal bearing strata of the Witbank Coalfield as contained within the Vryheid Formation of the Ecca Group. The Vryheid formation varies from 60 m to 200 m in thickness in the area and consists of alternating sandstones and shales.
- **Product Market:** Eskom with the target of providing premium Eskom spec of 22.5 MJ/kg CV (Calorific Value)
- **Life of Mine:** 10 years
- **Life of Mine ROM Tonnage**: 15 000 000 tons
- **Annual Production:** 1 500 000 ton
- **Coal Transport System:** Opencast – Haul trucks

Mining is conducted via opencast method by employing truck and shovel rollover mining technique. Strips of 45 m wide will be mined at a time. Burden material will be moved back into the pit in order to fill the voids and soils remove from subsequent strips will be used to dress the levelled spoils as part of the rehabilitation programmes. Coal that is removed from the initial pit will be transported via truck to the beneficiation plant whereas coal derived from the additional smaller pits will be trucked or transported via overland/underground conveyors to the nearest beneficiation plant.

ALTERNATIVES

Due to the nature of the application, alternative sites and mining methods are not considered feasible as the coal resource and reserve depth and location determines the mining layout. The option of not approving the amended EMP will result in inefficient environmental management of the mining operation and sterilization of potential coal resources and reserves in an area where mining has already been approved.

SENSITIVE ENVIRONMENTAL FEATURES

Table 2: Sensitive Features

SENSITIVE FEATURES	DETAILS
Wetlands and Surface Water	According to the South African National Biodiversity Institute"s (SANBI) Atlas for Freshwater Ecosystem Priority Areas (Nel, *et al* 2011), the project area is situated within the B11B quaternary catchment. Rivers and wetlands within this quaternary catchment (B11B) are considered as Freshwater Ecosystem Priority Area (FEPA). The B11B quaternary drainage area forms part of the Olifants Water Management Area (Figure 4). There are numerous wetland systems crossing the planned mining area, • Block B in drainage line and a channelled valley bottom wetland • Block C within a hillslope seepage wetland • Block D in the upper catchment of a channelled valley bottom wetland • Block E close to a channelled valley bottom wetland • Block F new situated in a drainage line
Ecological	Eastern Highveld Grassland Vegetation associated with wetland areas
Heritage	Potentially sensitive areas include Block F Graveyard in Block E.

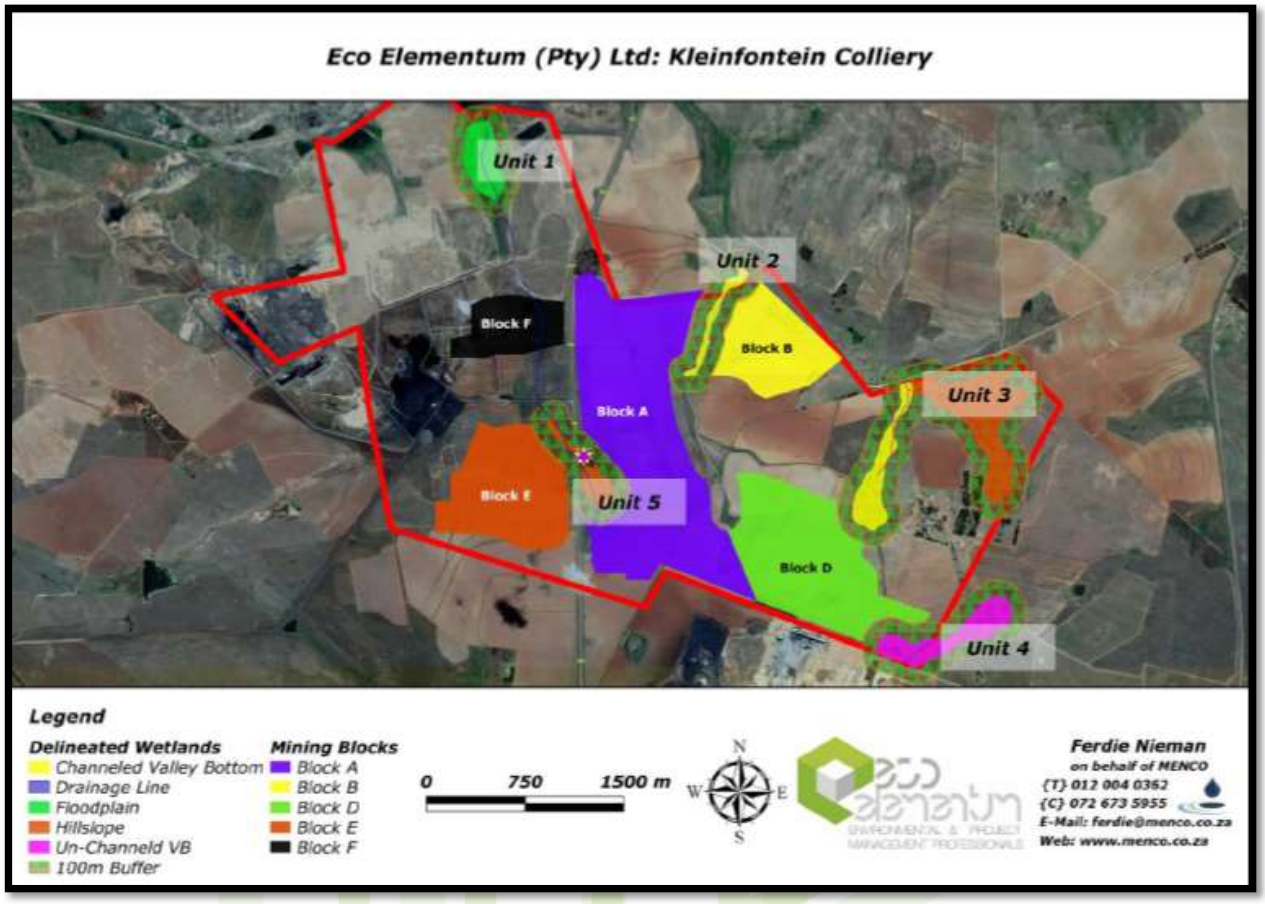

Figure 4: Wetland Units wihtin the Mining Right Area

IMPACT ASSESSMENT SUMMARY

The following impacts could potentially occur:

- Surface and Groundwater Contamination.
- Wetland degradation and lowering of PES/EIS class.
- Alteration of hydrological regimes.
- Impact on sensitive heritage features (Potentially sensitive areas include Block F,Graveyard in Block E.).
- Removal of natural vegetation and fragmentation of habitats.
- Faunal displacement and mortality.
- Dust and gaseous emissions.
- Soil contamination and loss of soil resources.
- Land use conversion (agricultural to mining).
- Noise and vibration nuisance.
- Decant of water and AMD.
- Job creation
- Economic stimulation
- Increase traffic

OUTCOME OF LANDOWNER CONSULTATION AND PUBLIC PARTICIPATION

Table 3: Outcome of the Public Participation with Affected Landowners

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					
JD Skosana/Sunil Mungaroo UMCEBO PROPERTIES: • REMAINING EXTENT OF PORTION 1 OF THE FARM MIDDELKRAAL 50 IS, • REMAINING EXTENT OF PORTION 4 OF THE FARM MIDDELKRAAL 50 IS • PORTION 14 (A PORTION OF PORTION 3) OF THE FARM LEEUWFONTEIN NO. 48 IS • REMAINING EXTENT OF PORTION 4 OF THE FARM LEEUWFONTEIN NO. 48 IS • REMAINING EXTENT OF PORTION 5 OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 15 (A PORTION OF PORTION 3) OF THE FARM LEEUWFONTEIN NO. 48 IS	08/01/2018 Email Registered Post				

• PORTION 16 (A PORTION OF PORTION 3) OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 2 OF THE FARM KLEINFONTEIN 49 IS					
OOSTHUIZEN, FREDERIK JOHANNES (CEO) Pieter Boshoff (Contact Person) Kleinfontein Colliery (Pty) Ltd • PORTION 17 OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 8 OF THE FARM KLEINFONTEIN 49 IS	Applicant/Client				
July Ndluvo (CEO) Anglo Coal Operations • PORTION 8 OF FARM KLEINFONTEIN NO. 49 IS	08/01/2018 Email Registered Post				
Sharon Clark (Principle Land and Biodiversity) BHP Billiton Coal South Africa (now SOUTH 32) REMAINDER OF THE FARM KLEINLEEUWFONTEIN 563 IS	08/01/2018 Email Registered Post				
LAWFUL OCCUPIER/S OF THE LAND					
OOSTHUIZEN, FREDERIK JOHANNES (CEO) Pieter Boshoff (Contact Person) Kleinfontein Colliery (Pty) Ltd • PORTION 17 OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 8 OF THE FARM KLEINFONTEIN 49 IS	Applicant/Client				
LANDOWNERS OR LAWFUL OCCUPIERS					

ON ADJACENT PROPERTIES X					
JD Skosana/Sunil Mungaroo UMCEBO PROPERTIES PORTION 4 OF THE FARM MIDDELKRAAL	08/01/2018 Email Registered Post				
MUNICIPAL COUNCILLOR X					
MUNICIPALITY (DISTRICT) X					
SK Mashilo Mayor (Nkangala District Municipality Pierre Rossouw Environmental Health Officer Nkangala District Municipality Charles Makula Nkangala District Municipality Municipal Manager	08/01/2018 Email 08/01/2018 Email Email + Hard Copy Report 08/01/2018				
MUNICIPALITY (LOCAL) X					
Ms D Lambrechts Steve Tshwete Local Municipality- Directorate Infrastructure Services - Physical and Environmental Development	Courier Hard Copy Report 08/01/2018				
Municipal Manager Gert Sibande District Municipality Steve Tshwete Local Municipality- Directorate Infrastructure Services - Physical and Environmental Development	Email+ Courier Copy Report 08/01/2018	11/04/2018 Comment received via email	Mr CA Habili (Municipal Manager) [sic] The above-mentioned report was received by the official on 26 October 2017. The comments to follow are in relation to the following legislations and policy directives:	Thank you for the comment received from your Department. All the duty of care principles listed in your comment forms part of the EIA Report and Environmental Management Plan. The biodiversity specialist will assess the site in terms of the Mpumalanga C-Plan.	

			• National Environmental Management Act (Act 107 of 1998) • National Environmental Management: Biodiversity Act (Act 10 of 2004) • Air Quality Management (Act 39 of 2004) • Waste Management Act (Act 59 of 2008) • Gert Sibande District Municipality By-laws (no. 2300 of 2014) • National Health Act (Act 61 of 2003) • National Water Act (Act 36 of 1998) as amended The following are comments from Gert Sibande District Municipality for consideration of the application: • The applicant must ensure that the requirements of the National Environmental Management Act (Act 107 of 1998), its Specific Environmental Management Acts and the Gert Sibande District Municipality By-Laws (No. 2300 of 2014) are adhered to. • No activities must be undertaken at any biodiversity and conservation sensitive areas within the proposed sites in terms of the District and Govan Mbeki Local Municipality Environmental Management Framework/plan.	Additional infrastructure (including 5 PCDs and associated infrastructure) will be located outside the 32m and 100m buffer zones of the wetlands located on site. Should any Section 21 water uses become necessary, the applicant will apply for the uses from the Department of Water and Sanitation.	

			• Duty of care principle as per the National Environmental Management Act, 107 of 1998 as amended, must be taken into account throughout the proposed project during all operations and close up. • In reference to Page 53 of the Draft Scoping Report (Kleinfontein Colliery Section 103 EMP Amendment – Draft Scoping Report) which indicated that a team of specialists and Engineers have been appointed to undertake the specialist studies which will investigate the baseline environmental, potential impacts and provide management measures where applicable. Reference must also be made of the Mpumalanga Biodiversity sector plan as well as the draft Gert Sibande bioregional plan. The district will not support any deviation / interference / obstruction of the wetlands. • In reference to Figure 25 of the Draft Scoping Report (Kleinfontein Colliery Section 103 EMP Amendment – Draft Scoping Report) which indicates that within the Kleinfontein Colliery boundary there are existing tributaries and rivers. The applicant must ensure that no new developments or operations are done within 100m of these tributaries and rivers.		

			• The applicant must put in place preventative and control measures for incidents as part of the EMPr in order to control and limit the negative impact of industrial activities and products on human, plants, animals and the environment, rehabilitation plans and procedures must be in place for any incidents response and immediate rehabilitation. • The processes must avoid all sources of dust or particulate matter generation ad immediate mitigation plans be implemented in consultation with the District Air Quality Officer including all unpaved roads. • There should be strict adherence to national road traffic Act prescriptions including District Noise By-Laws. • Water used for human consumption must comply with South African National Standards (241 – 1:2015) for drinking water and regular sampling be done on the SANAS accredited laboratory. • Should water be abstracted, permission should be received from the Department of Water and Sanitation (DWS). • All waste generated on site must be stored, handled and disposed of accordingly, i.e. general waste should be disposed of in a licensed municipal landfill site,		

			hazardous waste should be treated before disposal or disposed of at a licensed hazardous waste landfill site and mine discards should be discarded in a licensed landfill site.
			• Any complaints received from the public during the proposed activity phases must be documented and reported to the district and attended to within three working days after such reporting to the satisfaction of all parties engaged.
			  • All incidents or complaints should be reported to Department of Agriculture, Rural Development, Land and Environmental Affairs, Gert Sibande District Municipality and Govan Mbeki Local Municipality.
			  • The EMPr must include detailed but not be limited to the following:
			  ○ Environmental Pollution Prevention Plan
			  ○ Specialist Study Report impacts and mitigation measures
			  ○ Site specific Rehabilitation Plan
			  ○ Incident Emergency Plan
			  ○ Site Environmental Management Operational Plan		

			• The applicant should ensure that all supervisors and management on site is fully conversant with the content and requirements of the EMPr as part of the coping Report, including made available to the project manager and any other person(s) or organisation(s) working on the site. • The applicant must ensure that a qualified environmental person should be present at all times during operations on site in order to make contractors comply with the EMPr and any specific specialist recommendations to be made. • Monthly reports on the implementation of the EMPr must be sent to the relevant authorities.Should you have any queries, please contact Ms LF Magagula on 017 801 7177.		
MDEDE					
Mohau Ramodibe Mr J Mtsweni (Director)	Email 08/01/2018				
Ms. S.P. Xulu(HOD	Courier Hard Copy Report Email 08/01/2018				
Organs of state (Responsible for					

infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)					
Musa Lubambo DWS	Email 08/01/2018				
Ben Viljoen Department of Roads and Transport	Email 08/01/2018				
Noxolo Galela ESKOM	Email 08/01/2018				
Thami Hadebe Transnet Servitude Management	Email 08/01/2018				
Klaus Schimdt SANRAL	Email 08/01/2018				
Thabile Mkhabela Mpumalanga Commission on Restitution of Land Rights	Email 08/01/2018				
Themba Richard Milanzi (Department of Labour Assistant Manager)	Email 08/01/2018				
David Nkambule Mpumalanga Roads & Transport	Email 08/01/2018				
Musa Mondlane Director of Environmental Management - Mpumalanga Department of Agriculture and Land Affairs	Email 08/01/2018				
Andre Hoffman (Mpumalanga Tourism and Parks)	Email 08/01/2018				
Communities					
John Mokoena Obo Bathlaoane Ba Manzimnyanma (Land Claim on Kleinfontein 49 IS, Leeufontein 48 IS and other adjacent farms)	08/12/2018: Emailed DSR notification and collection of CD from Ecoelementum's offices	28/12/2017 Received registration letter via email 17/01/2018 Comment received	1) Land claim has been submitted for Kleinfontein 49IS, Leeuwfontein 48 IS and other adjacent farms 2) Need information on the mining method 3) Rehabilitation Plan information 4) Information on the Social and Labour Plan and the mining	1) The land claim has been noted 2) The mining method will be opencast. 3) This plan will be made available during the Draft EIA phase of the project 4) The SLP and Mining Charter will be made available during the Draft EIA phase of the project	Refer to Section D for more information

			charter. How does it benefit the local community? 5) What other economic benefit will flow from the current landowners to the successor in title such is royalties or lease income etc	5) Besides local employment and local economic development, the mining company will have to be consulted directly to discuss the pending land claim as the Title Deeds are currently in the name of the legal property owners.	
NL Bosman Agri Mpumalanga	Email 08/01/2018				
Thabo Madihlaba Environmental Justice Networking Forum Director	Email 08/01/2018				
Zweli Dlalisa Eastern Wetland Rehabilitation - Managing Director	Email 08/01/2018				
Erica Joubert Grassland Society of South Africa (GSSA)	Email 08/01/2018				
Chamber of Mines	Email 08/01/2018				
Dept. Land Affairs					
	XEmail 08/01/2018		No comment	N/A	N/A
Traditional Leaders					
	X N/A				
Dept. Environmental Affairs					
	Email 08/01/2018				
Registered I&AP X					
Johan		05/02/2018	Concerned over graves associated with the historic Valsfontein community/place which dates between 1930-1935	Mr Johan has been registered. Still awaiting his official contact details.	

SUMMARY OF ISSUES RAISED BY I&APS

The following comment/issues were raised during the public do date:

- A land claim has been submitted for Kleinfontein 49 IS, Leeuwfontein 48 IS and other adjacent farms by Obo Bathlaoane Ba Manzimnyanma.
- Heritage / Gravesite areas.

CONCLUSION AND RECOMMENDATIONS

No fatal flaws have been identified through any of the specialist studies undertaken to date. The following recommendations are made in respect of this application:

- The inclusion of the 100 m buffer zone around wetland areas and surface water bodies
- The inclusion of the new proposed Stormwater Management Plan requirements (Eco Elementum Engineering (Pty) Ltd, 2018) as follow (as discussed under ***Sections 4.3.11*** and ***4.3.11***):
    - Dirty Water Infrastructure: Block A & D (Western PCD), Block B PCD, Block D (Eastern PCD), Block E PCD and Block F PCD
    - Six new grass lined clean water channels
    - Waste material generated on site (Type-3) and will require a Class C barrier as per the new waste classification regulations of the National Environmental Management: Waste Act 59 of 2008
- A Water Use License must be obtained prior to water uses being undertaken (activities within 500m of a wetland)
- Update the numerical and geochemical model against monitored data during operations every two years
- Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations.
- The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts
- All monitoring requirements to be undertaken throughout the LOM including:
    - Dust Monitoring.
    - Groundwater Monitoring.
    - Surface Water Monitoring.
    - Noise Monitoring.
    - Blasting and Vibration Monitoring.
    - Bio-Monitoring.
- Care must be exercised during construction phases in order to ensure the safeguarding of potential heritage resources. The only site of heritage importance observed on **Block E was the graveyard (KB01)**, which is protected by legislation. ntents

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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

AEL	Atmospheric Emissions License in terms of NEM:AQA
AMD	Acid Mine Drainage
ASTM	American Standard for Testing and Materials (followed by protocol number)
BA	Basic Assessment (process or report)
BID	Background Information Documents
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983) as amended
CBD	Central Business District
COP	Codes of Practice
C-Plan	Conservation Plan (specifically Mpumalanga Conservation Plan)
DMC	Dense Medium Circuit (associated with processing plant)
DMR	Department of Mineral Resources
DO	Dissolved Oxygen
DWS	Department of Water Affairs and Sanitation
EA	Environmental Authorisation in terms of NEMA
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989) as amended
EIA	Environmental Impact Assessment (process or report)
EIA Regulation	Environmental Impact Assessment Regulation published under NEMA
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme Report
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GN	General Notice (issued under an Act, providing notice or information)
GNR	General Notice Regulation (issued under an Act, providing instruction)
HSTP	Human Settlement Plan
I&AP	Interested and Affected Parties
IAIA SA	International Association of Impact Assessment South Africa
IDP	Integrated Development Plan
IWUL	Integrated Water Use License
IWULA	Integrated Water Use License Application
IWWMP	Integrated Water and Waste Management Plan
LED	Local Economic Development
LoM	Life of Mine
MHSA	Mine Health and Safety Act (Act 29 of 1996) as amended
MPRDA	Mineral and Petroleum Resources Development Act (Act 28 of 2002) as amended
MR	Mining Right in terms of the MPRDA
MRA	Mining Right Application in terms of the MPRDA
NAEIS	National Atmospheric Emissions Inventory System
NEA	National Energy Act, Act 34 of 2008

NEM:AQA	National Environmental Management: Air Quality Act (act 59 of 2008) as amended
NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004) as amended
NEM:PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003) as amended
NEM:WA	National Environmental Management: Waste Act (Act 39 of 2004) as amended
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NFEPA	National Freshwater Ecological Priority Areas
NHRA	National Heritage Resources Act (Act No. 25 of 1999) as amended
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act (Act 35 of 1998) as amended
PCD	Pollution Control Dam
PDA	Potential Development Area (in terms of the SDF)
PES	Present Ecological State (usually followed by category A-F)
PM10/5/2.5	Particulate Matter up to 10/5/2.5 micrometers
POI	Points of Interest
PPP	Public Participation Process
RoD	Record of Decision (for specific application)
RoM	Run Of Mine
RWD	Return Water Dam
RWQO	Resource Water Quality Objectives
SCC	Species of Conservation Concern
S&EIR	Scoping and Environmental Impact Reporting process
S&LP	Social and Labour Plan
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SAMRAD	South African Mineral Resources Administration System
SANBI	South African National Biodiversity Institute
SANS	South African National Standard (followed by standard number)
SASS5	South African Scoring System version 5 (in terms of aquatic invertebrate assessments)
SAWIS	South African Waste Information System
SDF	Spatial Development Framework (specifically LLM)
SEMA	Specific Environmental Management Acts
SMME	Small and Medium and Micro Enterprise
SOP	Standard Operating Procedure
SPLUMA	Spatial Planning and Land Use Management Act (Act No.16 of 2013)
Stats SA	Statistics South Africa
Tph	Tons per hour
WMA	Water Management Area
WML	Waste Management License in terms of NEM:WA

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 4: Applicant Details

Applicant Name:	Kleinfontein Colliery (Pty) Ltd
Registration No.:	2003/017639/07
Contact Person:	Pieter Boshoff
Telephone:	0718608177
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Postal Address:	Private Bag X1838, Middelburg, Mpumalanga, 1050
Physical Address:	Hektaar Street, Middelburg, Mpumalanga,1050

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

Eco Elementum (Pty) Ltd has been appointed by Kleinfontein Colliery (Pty) Ltd to undertake the section 102 EMP Amendment and Integrated Water Use License Application for the Jicama opencast mining area to include various extensions of existing approved opencast mining blocks and related mining infrastructure required to mine the areas in a responsible manner while giving effect to environmental and water resource protection ensuring minimal impacts through effective management. During further invasive drilling and exploration activities on the Jicama mining area new geological information became available which resulted in the mining layouts to be altered to ensure optimal mining and utilisation of the available coal resources. This application therefore serves to seek approval for the revised mining layout.

Kleinfontein Colliery (Pty) Ltd is located on the Mpumalanga Highveld in the Olifants River Catchment, on a number of properties and holds surface and/or mining rights on these properties. The total size of the properties on which Kleinfontein Colliery is located is 5 096ha while Mining Rights are held over approximately 3 098 ha of these properties. The boundaries and locations of these properties, with the applicable mine area sections are illustrated below.

Kleinfontein Colliery is situated on and has an approved EMPr in respect of the following properties;

- Portion 8 of the farm Kleinfontein 49 IS
- A Portion of Portion 4 of the farm Kleinfontein 49 IS
- Portions 5, 14, 15, 16 and 17 of the farm Leeuwfontien 48 IS
- A Portion of Portion 18 of the farm Leeuwfontein 48 IS
- The Remaining Extent of Portion 1 of the Farm Middelkraal 50 IS; and
- Portion 4 of the Farm Middelkraal 50 IS

1.1 PROJECT DESCRIPTION

The following tables summarises the historical timeline of land uses, ownership, Mining Rights and EMP's on the properties that currently comprise the Kleinfontein Colliery.

Table 5: Historical Timeline of the Kleinfontein Colliery Properties (1)

Date	Land-use/Action/Activity relating to Mining Rights and EMPRs
Since Pre-1985	The land-use on the properties was predominantly commercial *maize* farming
circa 1985	Underground mining activities undertaken by Koornfontein Mines (BECSA) on the farm Kleinleeuwfontein 563 IS
Circa 2004	Quickstep 556 (Pty) Ltd, of which Umcebo Mining (Pty) Ltd is a majority shareholder, acquires Portion 3 of the farm Kleinfontein 49 IS
Circa March 2004	Application for Mining Right for Kleinfontein accepted by DMR
26 September 2004	Quickstep 556 (Pty) Ltd submits a EMPR Application (compiled by GCS) to the DMR to mine on Portion 3 of the farm Kleinfontein 49 IS
28 September 2005	DMR **approves** an Mining Right for Quickstep 556 (Pty) Ltd to for Portion 3 (A Portion of Portion 1) of the farm Kleinfontein 49 IS (attached as **Part 2 of Appendix 2**)
28 September 2005	DMR **approves** the EMPR for Quickstep 556 (Pty) Ltd for Portions 1 and 30 (*sic*) of the farm Kleinfontein 49 IS (attached as **Part 2 of Appendix 2**)
April 2006	Opencast Mining Operations by Quickstep 556 (Pty) Ltd commences
circa 2006	Quickstep 556 (Pty)Ltd undergoes a name change to Kleinfontein Colliery (Pty) Ltd, and Kleinfontein Colliery (Pty)Ltd becomes a wholly owned subsidiary of Umcebo Mining (Pty) Ltd
19 June 2008	DMR **approves** an Amended Mining Right (attached as **Part 2 of Appendix 2**) for Kleinfontein Colliery (Pty) Ltd to supersede the 28/9/2005 Mining Right, to include the following properties: • Portion 3 (A Portion of Portion 1) of the farm Kleinfontein 49 IS; • Portion 2 of the farm Kleinfontein 49 IS; • The Remainder of the farm Leeuwfontein 48 IS; and • The Remainder of the farm Kleinleeuwfontein 548 IS
15 December 2008	Umcebo Mining (Pty) Ltd submits an EMPR Amendment (Revision 1), prepared by JKC, to the DMR
13 January 2009	DMR **approves** an EMPR Amendment (Revision 1) for Kleinfontein Colliery (Pty) Ltd (attached as **Part 2 of Appendix 2**) in respect of the following properties: • Portion 2 and 8 of the farm Kleinfontein 49 IS; • The Remainder of the farm Leeuwfontein 48 IS; and • The Remainder of the farm Kleinleeuwfontein 548 IS
circa 2009	Umcebo submits a Mining Rights Application to mine block of coal adjacent to Kleinfontein Colliery, which is to be known as Jicama
12 March 2010	DMR grants an Amended Mining Right (attached as **Part 2 of Appendix 2**) for Kleinfontein Colliery (Pty) Ltd to include the following properties: • Portion 8 of the farm Kleinfontein 49 IS; • A Portion of Portion 4 of the farm Kleinfontein 49 IS; • Portions 5, 14, 15, 16, 17 of the farm Leeuwfontein 48 IS; • A Portion of Portion 18 of the farm Leeuwfontein 48 IS; • The Remaining Extent of Portion 1 of the Farm Middelkraal 50 IS; and • Portion 4 of the Farm Middelkraal 50 IS
December 2010	Umcebo Mining (Pty) Ltd submits an EMPR Amendment, prepared by JKC, to the DMR to incorporate the Jicama portions into the Kleinfontein Complex
15 November 2011	DMR approves an EMPR Amendment (attached as **Part 2 of Appendix 2**) for Kleinfontein Colliery (Pty) Ltd in respect of the following properties, which includes Jicama: • Portion 8 of the farm Kleinfontein 49 IS; • A Portion of Portion 4 of the farm Kleinfontein 49 IS; • Portions 5, 14, 15, 16, 17 of the farm Leeuwfontein 48 IS; • A Portion of Portion 18 of the farm Leeuwfontein 48 IS; • The Remaining Extent of Portion 1 of the Farm Middelkraal 50 IS; and • Portion 4 of the Farm Middelkraal 50 IS

Table 6: Historical Timeline of the Kleinfontein Colliery Properties (2)

Title Deed #	Property name as per Title Deed	Size (ha)	Surface ownership	Mining Right Holder	Date Mining Right granted	Date EMP Approved	Notes* (MR & EMP approvals attached as Appendix 2)
T 86404/1991	The farm Kleinleeuwfontein 563 IS	116,5687	BHP Billiton Energy Coal South Africa	Kleinfontein Colliery (Pty) Ltd	2008-06-19 MR # 17	2009-01-13	(MR & EMP refer to Remainder of the farm Kleinleeuwfontein 563 IS)
T 27513/2004	Portion 3 (a portion of portion 1) of the farm Kleinfontein 49 IS	310,0732	Kleinfontein Colliery (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2008-06-19 MR # 17	2005-09-28	(EMP refers to Portion 1 and 30 (typo) of the farm Kleinfontein 49 IS)
T 18092/2008	Remaining Extent of Portion 2 of the farm Kleinfontein 49 IS	481,2092	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2008-06-19 MR # 17	2009-01-13	(MR & EMP refer to Portion 2 of the farm Kleinfontein 49 IS)
T334942/2007	Portion 8 (a portion of portion 4) of the farm Kleinfontein 49 IS	818,3464	Anglo Operations (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15 2009-01-13	(MR refers to Portion 8 of the farm Kleinfontein 49 IS) (EMP approval refers to Portion 8 of the farm Kleinfontein 49 IS)
T 18090/2008	Remaining Extent of Portion 4 (Driehoek) of the farm Leeuwfontein 48 IS	128,4798	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to A Portion of Portion 4 of the farm Leeuwfontein 48 IS)
T 18090/2008	Remaining Extent of Portion 5 of the farm Leeuwfontein 48 IS	279,9274	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to Portion 5 of the farm Leeuwfontein 48 IS)
T 18090/2008	Portion 14 (a portion of portion 3) of the farm Leeuwfontein 48 IS	40,2570	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to Portion 14 of the farm Leeuwfontein 48 IS)
T 18091/2008	Portion 15 (a portion of portion 3) of the farm Leeuwfontein 48 IS	40,2570	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to Portion 15 of the farm Leeuwfontein 48 IS)
T 18091/2008	Portion 16 (a portion of portion 3) of the farm Leeuwfontein 48 IS	59,9572	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to Portion 16 of the farm Leeuwfontein 48 IS)
T 17708/2007	Portion 17 (a portion of portion 5) of the farm Leeuwfontein 48 IS	8,5654	Ilanga Coal Mines(Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to Portion 17 of the farm Leeuwfontein 48 IS)
T 18089/2008	Portion 18 (a portion of portion 4) of the farm Leeuwfontein 48 IS	128,4798	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(MR & EMP refer to Portion of Portion 18 of the farm Leeuwfontein 48 IS)
T 18089/2008	Remaining Extent of Portion 1 of the farm Middelkraal 50 IS	683,5125	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	
T 18089/2008	Portion 4 (a portion of portion 1) of the farm Middelkraal 50 IS	1,7131	Umcebo Prop (Pty) Ltd	Kleinfontein Colliery (Pty) Ltd	2010-03-12 MR # 318	2011-11-15	(EMP approval refers to Portion 4 of the farm Middelkraal 50 IS, mining right grant refers to Remaining Extent of Portion 4 of the farm Middelkraal 50 IS)
T 18092/2008	Remaining Extent of the farm Kleinfontein 49 IS	171,3064	Umcebo Prop (Pty) Ltd				Only surface ownership
T 18090/2008	Portion 6 of the farm Kleinfontein 49 IS	228,4058	Umcebo Prop (Pty) Ltd				Only surface ownership
T 18089/2008	Remaining Extent of Portion 7 of the farm Kleinfontein 49 IS	78,5454	Umcebo Prop (Pty) Ltd				Only surface ownership
T 18090/2008	Portion 11 (a portion of portion 7) of the farm Kleinfontein 49 IS	78,5154	Umcebo Prop (Pty) Ltd				Only surface ownership
T 18092/2008	Remaining Extent of Portion 19 of the farm Leeuwfontein 48 IS	147,8032	Umcebo Prop (Pty) Ltd				Only surface ownership
no longer exists	Remainder of the farm Leeuwfontein 48 IS			Kleinfontein Colliery (Pty) Ltd	2008-06-19 MR # 17	2009-01-13	**no longer exists**
T 83528/1998	Portion 10 (a portion of portion 1) of the farm Kleinfontein 49 IS	211,2779	Anglo Operations (Pty) Ltd				(some monitoring points and rehabilitation infrastructure of Kleinfontein Colliery located on this property, but it is not part of Kleinfontein Colliery)

* Note that the description of properties on the Mining Rights and EMP approvals refer to the polygons applied for and not to the property descriptions on the Title Deeds.

1.2 MINING PROCESS

- **Mineral**: Coal (Bituminous Coal). Possible Pseudocoal and Torbanite will be mined if encountered.
- **Mining Method:** Opencast "Rollover Method".
- **Depth of mineral below service:** Depth of the lower coal seams varies from 15 to 55 metres but could be up to 65 metres in isolated areas.
- **Geological Formation:** Coal bearing strata of the Witbank Coalfield as contained within the Vryheid Formation of the Ecca Group. The Vryheid formation varies from 60m to 200m in thickness in the area and consists of alternating sandstones and shales.
- **Product Market:** Eskom with the target of providing premium Eskom spec of 22.5MJ/kg CV (Calorific Value)
- **Life of Mine:** 10 years.

- **Life of Mine ROM Tonnage**: 15 000 000 ton
- **Annual Production:** 1 500 000ton
- **Coal Transport System:** Opencast – Haul trucks.

Mining is conducted via opencast method by employing truck and shovel rollover mining technique. Strips of 45 m wide will be mined at a time. Burden material will be moved back into the pit in order to fill the voids and soils remove from subsequent strips will be used to dress the levelled spoils as part of the rehabilitation programmes. Coal that is removed from the initial pit will be transported via truck to the beneficiation plant whereas coal derived from the additional smaller pits will be trucked or transported via overland/underground conveyors to the nearest beneficiation plant.

2. CONTACT DETAILS

2.1 APPLICANT

Table 7: Applicant Details

Applicant Name:	Kleinfontein Colliery (Pty) Ltd
Registration No.:	2003 / 017639 / 07
Contact Person:	Pieter Boshoff
Telephone:	0718608177
Fax:	N/A
E-mail:	pieter@eyethucoal.com
Postal Address:	90 Rivonia Road Ground Floor, North Wing Webber Wentzel Building

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

Table 8: EAP Details

EAP:	Eco Elementum (Pty) Ltd - Environmental and Engineering
Contact Person:	Henno Engelbrecht (Author and EAP)) Carene Kruger (External Reviewer)
Telephone:	012 807 0383
Fax:	N/A
E-mail:	henno@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 9: EAP Qualifications

Name	Henno
Surname	Engelbrecht
Name	Henno
Company	Eco Elementum (Pty) Ltd
Position	Director – Senior Environmental Consultant
Location	The Willows Office Park, Die Wilgers, Pretoria
Email	henno@ecoelementum.co.za
Telephone Number	072 196 9928/ 012 807 0383
Education	• MSc Project Management – UP • Master's Degree at University of Pretoria in Pretoria, South Africa • BSc- Honours in Environmental Management and Analysis • Honours Degree at University of Pretoria in Pretoria, South Africa
Professional skills	Mr. Henno Engelbrecht has 10 years working experience as an Environmental Consultant and he has specialised in Environmental Management and Analysis. Henno has worked for Environmental Assurance Pty (Ltd) as an environmental consultant since completing his studies until mid-2013 and has served an array of clients in various fields of environmental practice. He also has vast environmental monitoring & measurement, environmental authorisations, mine closure, and environmental impact assessment experience and has worked with in various project teams, up unto the level of Programme Manager where he was responsible for all the projects which fell within the Environmental Assurance (Pty) Ltd programme. He also assisted in various training related to the environmental sector and developed two SETA accredited training modules for environmental awareness related courses. Henno has established and implemented various environmental monitoring and measurement programmes for clients in order to support the Environmental Management Programmes, comply with relevant National Environmental Management Acts, the Water Act, Minerals and Petroleum Resources Development Act and ISO14001 standards. His expertise has led to his specialist inputs and studies to be used in several Environmental Impact Assessments, Water Use License Applications, Waste License Applications, Air Emission License Applications and Mine Closure/Rehabilitation Planning Activities. Henno also holds the MSc Project Management degree at the Engineering Faculty at the University of Pretoria. He has worked in mining, industrial, natural and construction environments but his expertise lies mainly within the mining sector and currently holds the position of Director at Eco Elementum (Pty) Ltd.

2.3.2 Summary of the EAP's Past Experience

Table 10: 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	• Mr. Henno Engelbrecht has been an Environmental Assessment Consultant for 10 years, during this time he has conducted S/EIA's, Basic Assessments, rehabilitation planning, developed EMPr (This includes conducting screening and scoping exercises, baseline studies, impact assessments, monitoring, and management planning and implementation). • His expertise has led to his specialist inputs and studies to be used in several Environmental Impact Assessments, Water Use License Applications, Waste License Applications, Air Emission License Applications and Mine Closure/Rehabilitation Planning Activities. • Henno also holds the MSc Project Management degree at the Engineering Faculty at the University of Pretoria. • He has worked in mining, industrial, natural and construction environments but his expertise lies mainly within the mining sector and currently holds the position of Director at Eco Elementum (Pty) Ltd.

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

Table 11: Location of the property

Farm Name:	Various Portions of the Farms Middelkraal No. 50 IS, Leeuwfontein No. 48 IS, Kleinfontein No. 49 IS and the Farm Kleinleeuwfontein 563 IS
Application area (Ha)	2968,851 hectares (ha).
Magisterial district:	Magisterial district of Bethal and Middelburg. Steve Tshwete Local Municipality (Nkangala District) and Govan Mbeki Local Municipality (Gert Sibande District Municipality).
Distance and direction from nearest town	The town of Hendrina is situated 25km to the east (direct distance, not distance by road). The town of Pullen's Hope is situated 20km north-east (direct distance, not distance by road). The town of Middelburg is approximately 30km south of Middelburg.
21 digit Surveyor General Code for each farm portion	**Kleinleeuwfontein 563 IS** T0IS00000000056300000 **Leeuwfontein 48 IS** T0IS00000000004800000 Portion 4 T0IS00000000004800004 RE Portion 18 T0IS00000000004800018 RE Portion 5 T0IS00000000004800005 Portion 14 T0IS00000000004800014 Portion 15 T0IS00000000004800015 Portion 16 T0IS00000000004800016 Portion 19 T0IS00000000004800019 **Kleinfontein 49 IS** T0IS00000000004900000 Portion 3 T0IS00000000004900003 Portion 2 T0IS00000000004900002 Portion 6 T0IS00000000004900006 Portion 11 T0IS00000000004900011 Portion 7 T0IS00000000004900007 Portion 8 T0IS00000000004900008 Remaining Extent T0IS00000000004900000 **Middelkraal 50 IS** T0IS00000000005000000 RE Portion 7 T0IS00000000005000007 RE Portion 2 T0IS00000000005000002 Portion 1 T0IS00000000005000001

3.1 LOCALITY MAP

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

The current mining area comprises over 2,968.851ha and is located within the Steve Tshwete Local Municipality (Nkangala District) and Govan Mbeki Local Municipality (Gert Sibande District Municipality) approximately 30km south of the Middelburg, Mpumalanga Province.

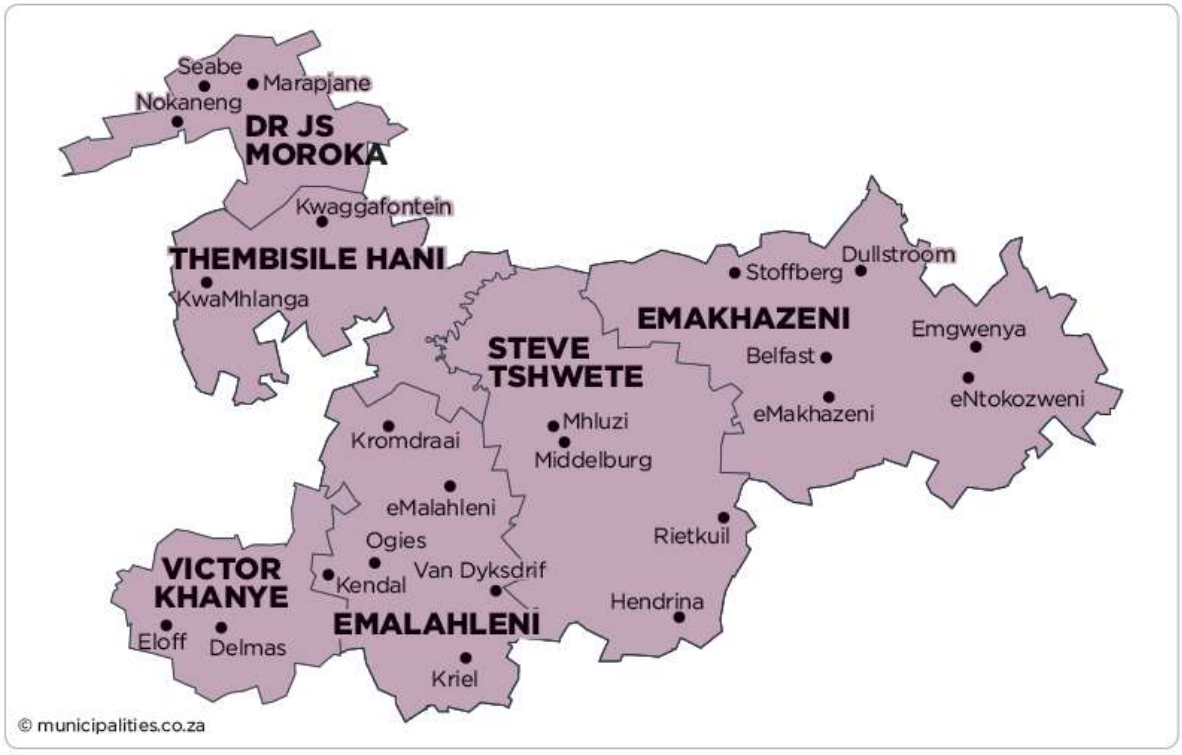


Figure 5: Gert Sibande District Municipality

The regional and local settings are depicted below. Note: please refer to Appendix 4 for the layout plans in A3 format.

3.2 SURFACE RIGHT OWNERS

Table 12: Summary of Surface Right Owners

MINING SECTION	LAND DESCRIPTION	TOTAL AREA (HA)	REGISTERED OWNER
JICAMA SECTION (318 MR)	Remaining extent of portion 1 of the farm Middelkraal 50 is,	685,2256	Umcebo Properties
	Remaining extent of portion 4 of the farm Middelkraal 50 is		Umcebo Properties
	Portion 14 (a portion of portion 3) of the farm Leeuwfontein no. 48 is	40,2570	Umcebo Properties
	Remaining extent of portion 4 of the farm I Leeuwfontein no. 48 is	128,4798	Umcebo Properties
	Remaining extent of portion 5 of the farm Leeuwfontein no. 48 is	279,9274	Umcebo Properties
	Portion 15 (a portion of portion 3) of the farm Leeuwfontein no. 48 is	40,2570	Umcebo Properties
	Portion 16 (a portion of portion 3) of the farm Leeuwfontein no. 48 is	59,9572	Umcebo Properties
	Portion 17 of the farm Leeuwfontein n no. 48 is,	8,5654	Ilanga Coal Mines (Pty) Ltd
	Portion 8 of farm Kleinfontein no. 49 is	818,3330	Anglo Coal Operations
	TOTAL AREA		**279,9274**
KLEINFONTEIN SECTION (17MR)	Portion 8 of the farm Kleinfontein 49 is	310,0732	Kleinfontein Collierty (Pty) Ltd
	Portion 2 of the farm Kleinfontein 49 is	481,2092	Umcebo Properties
	Remainder of the farm Kleinleeuwfontein 563 is	116,5687	BHP Billiton Coal South Africa
	TOTAL AREA		**1726,181**
TOTAL MINING RIGHT AREA			**2968,851**

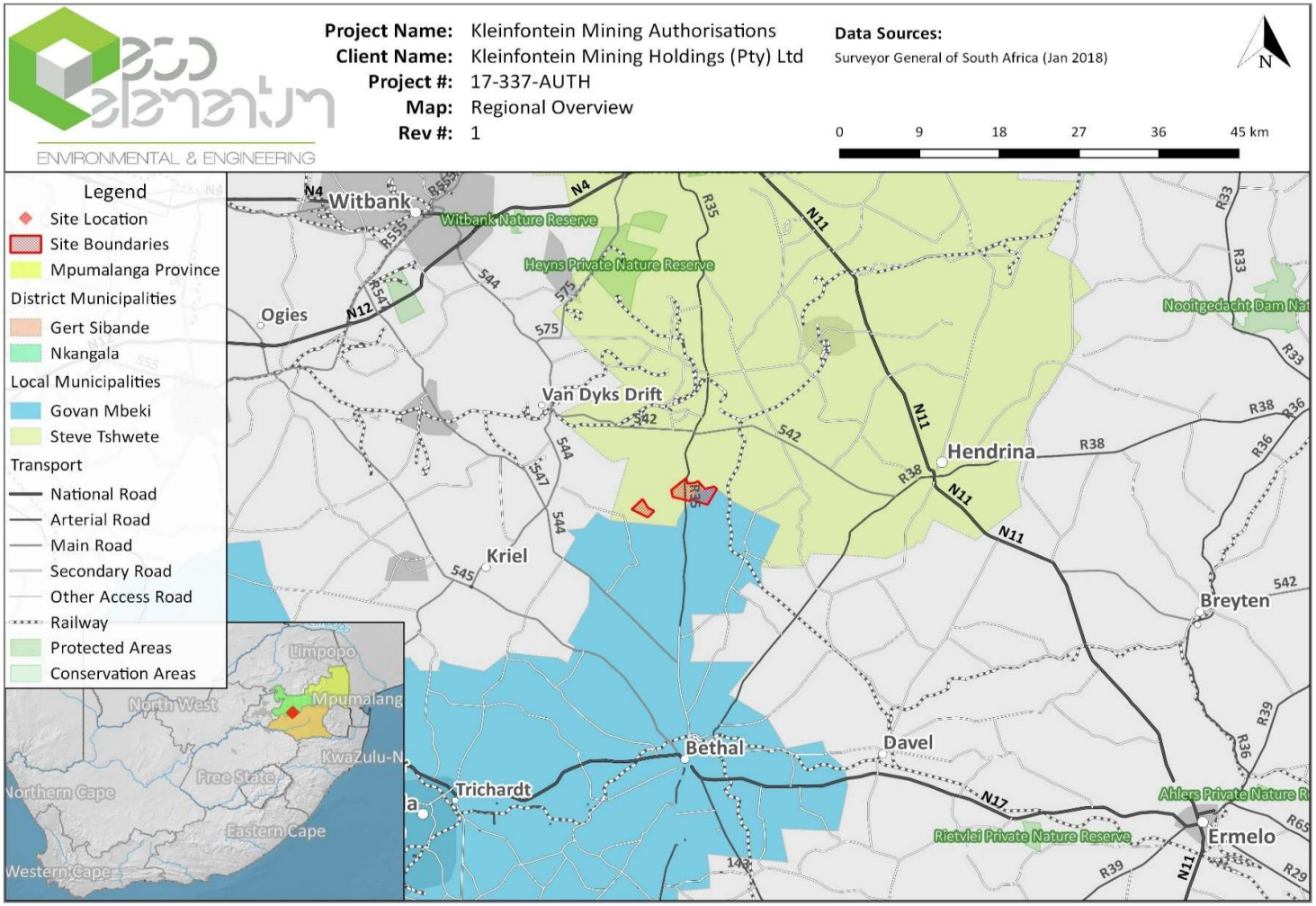


Figure 6: Regional Overview Plan

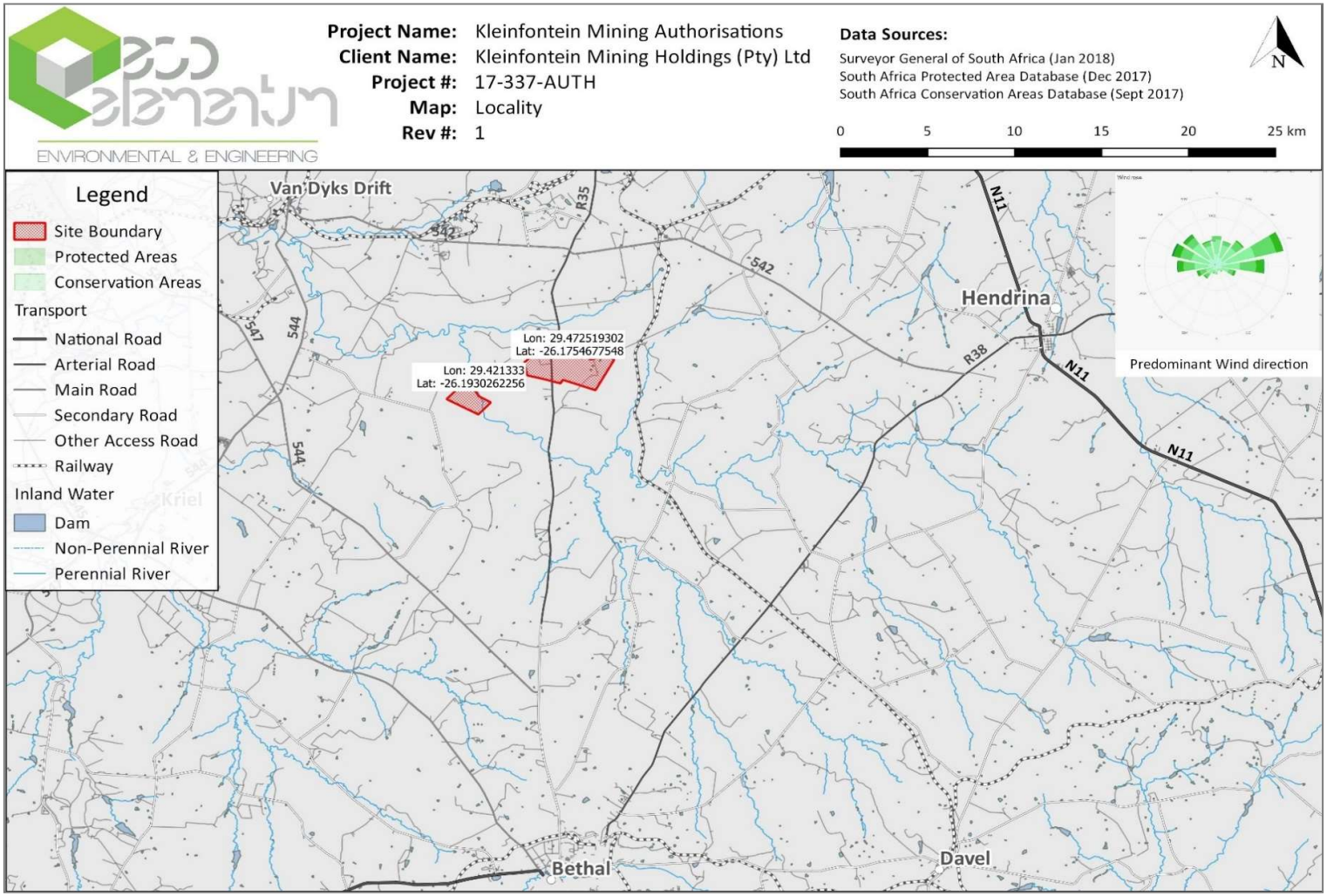


Figure 7: Locality Plan

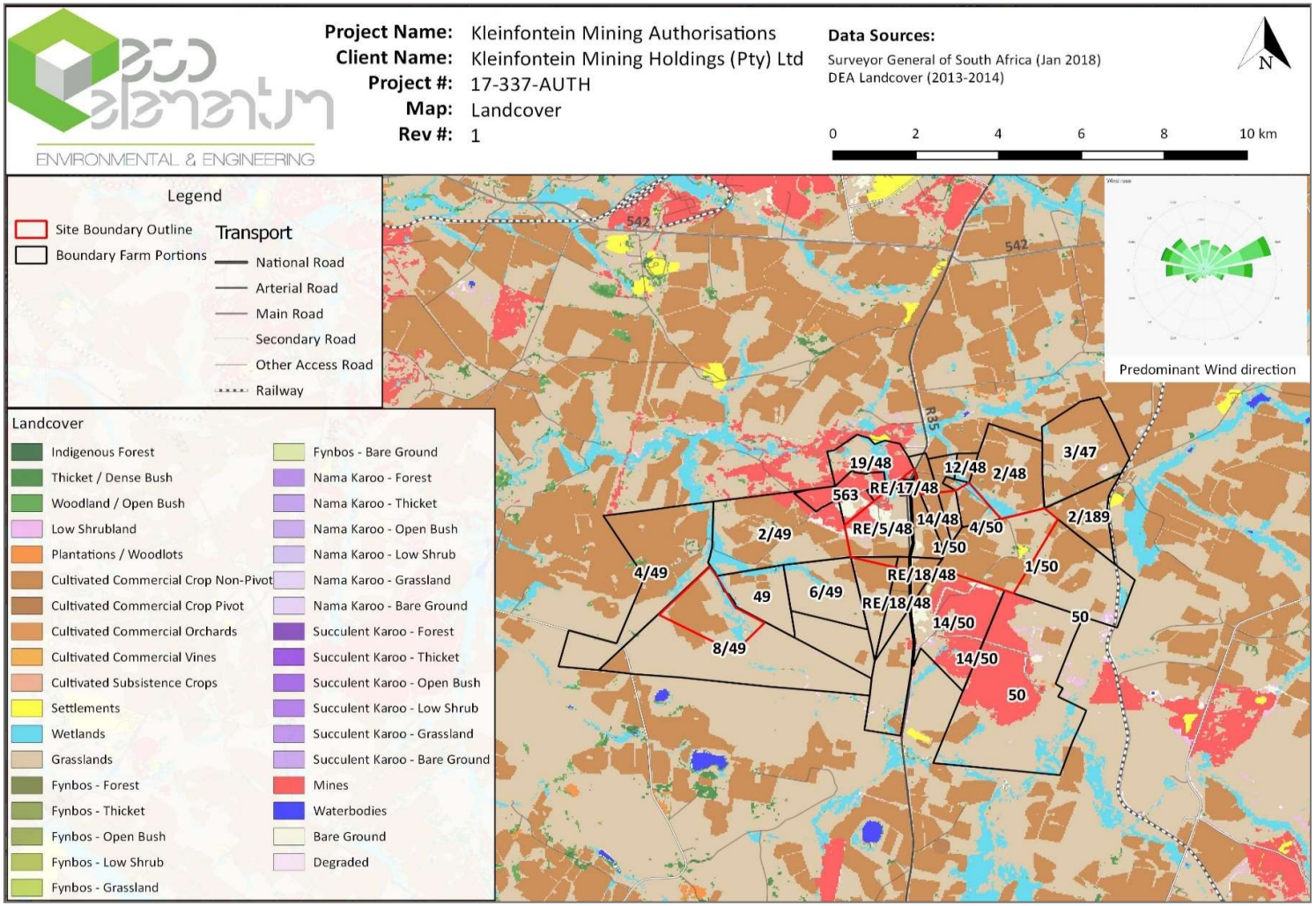


Figure 8: Landcover Map

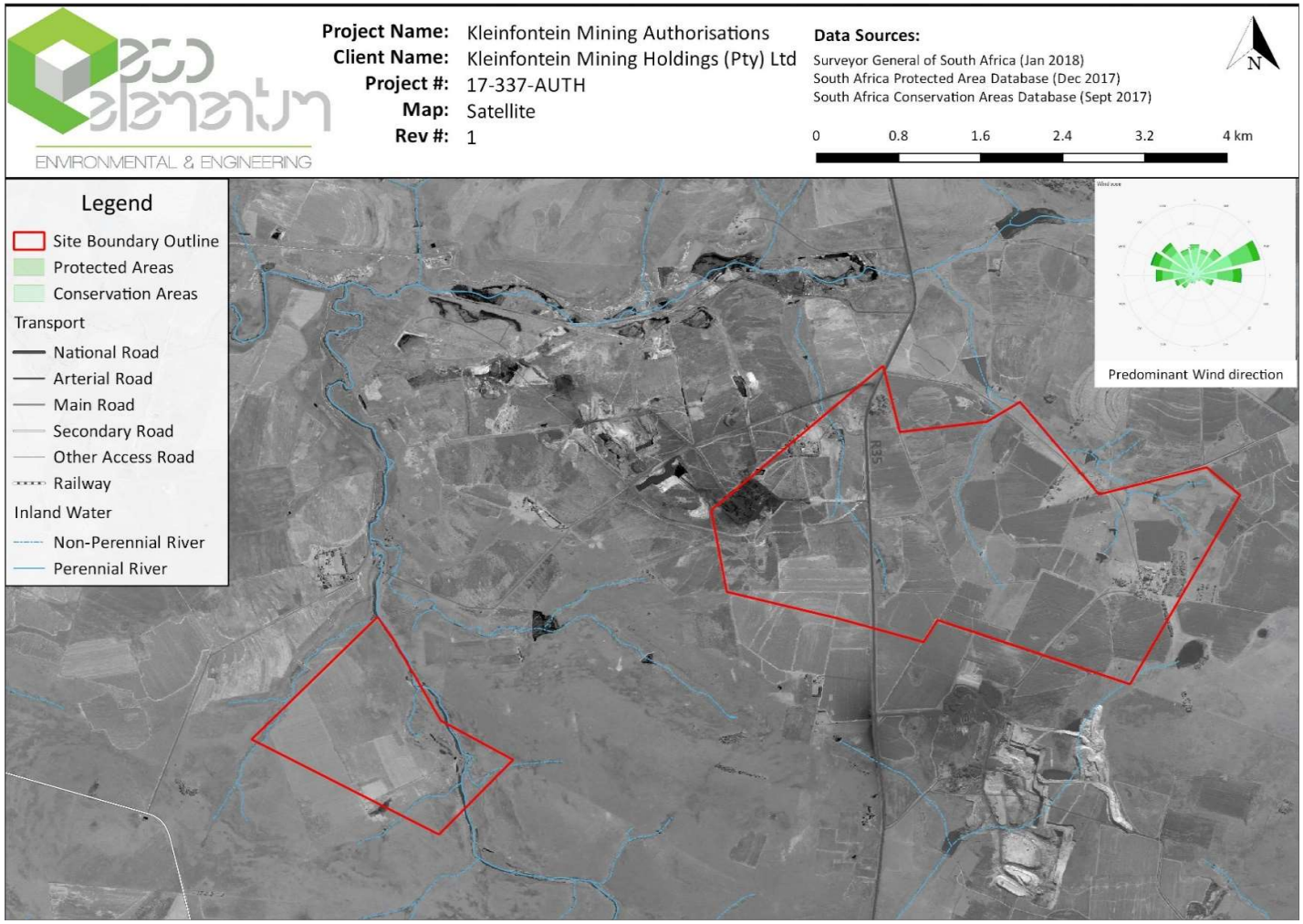


Figure 9: Satellite Image of Site

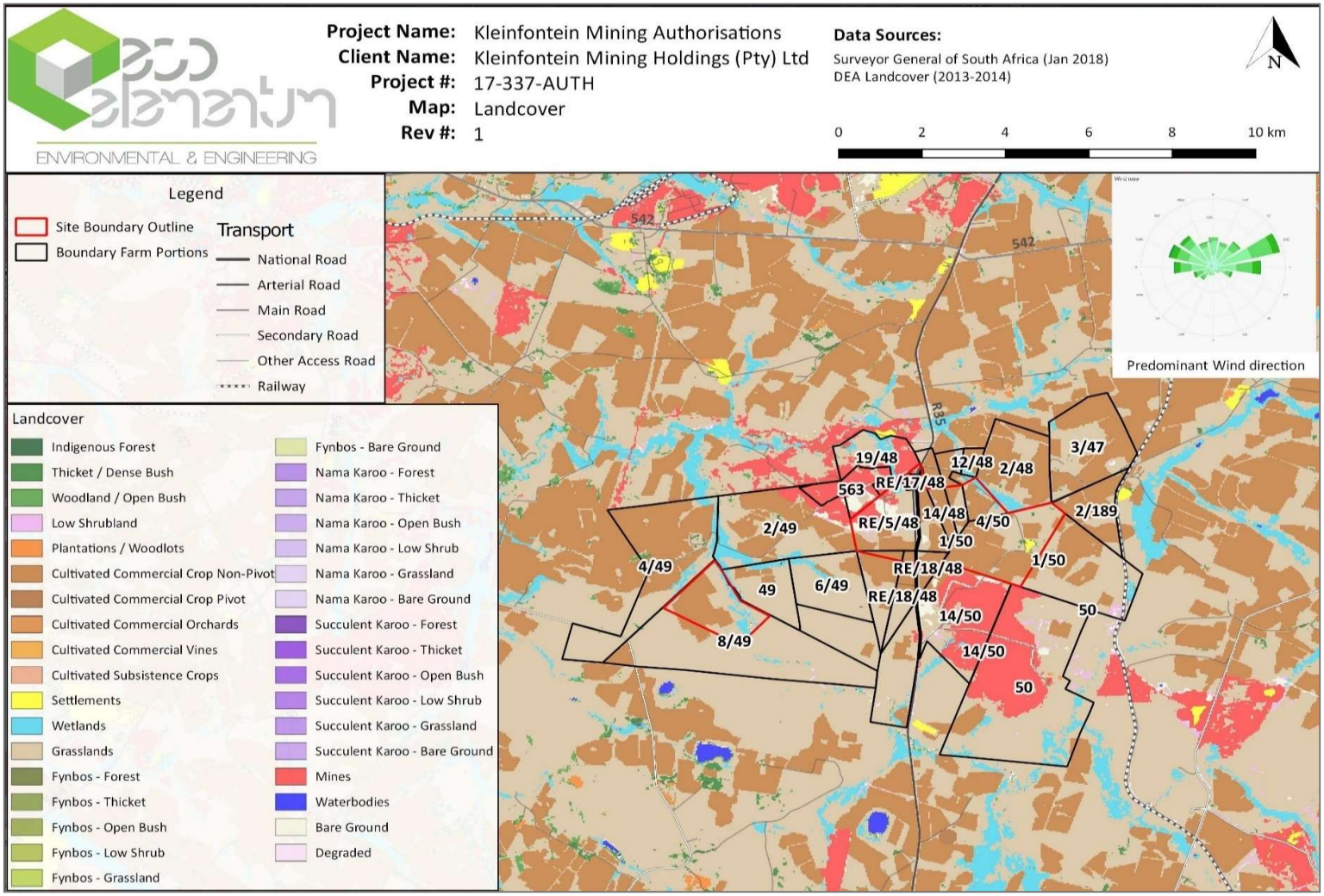


Figure 10: Land cover

Figure 11: NFEPA Wetland Map

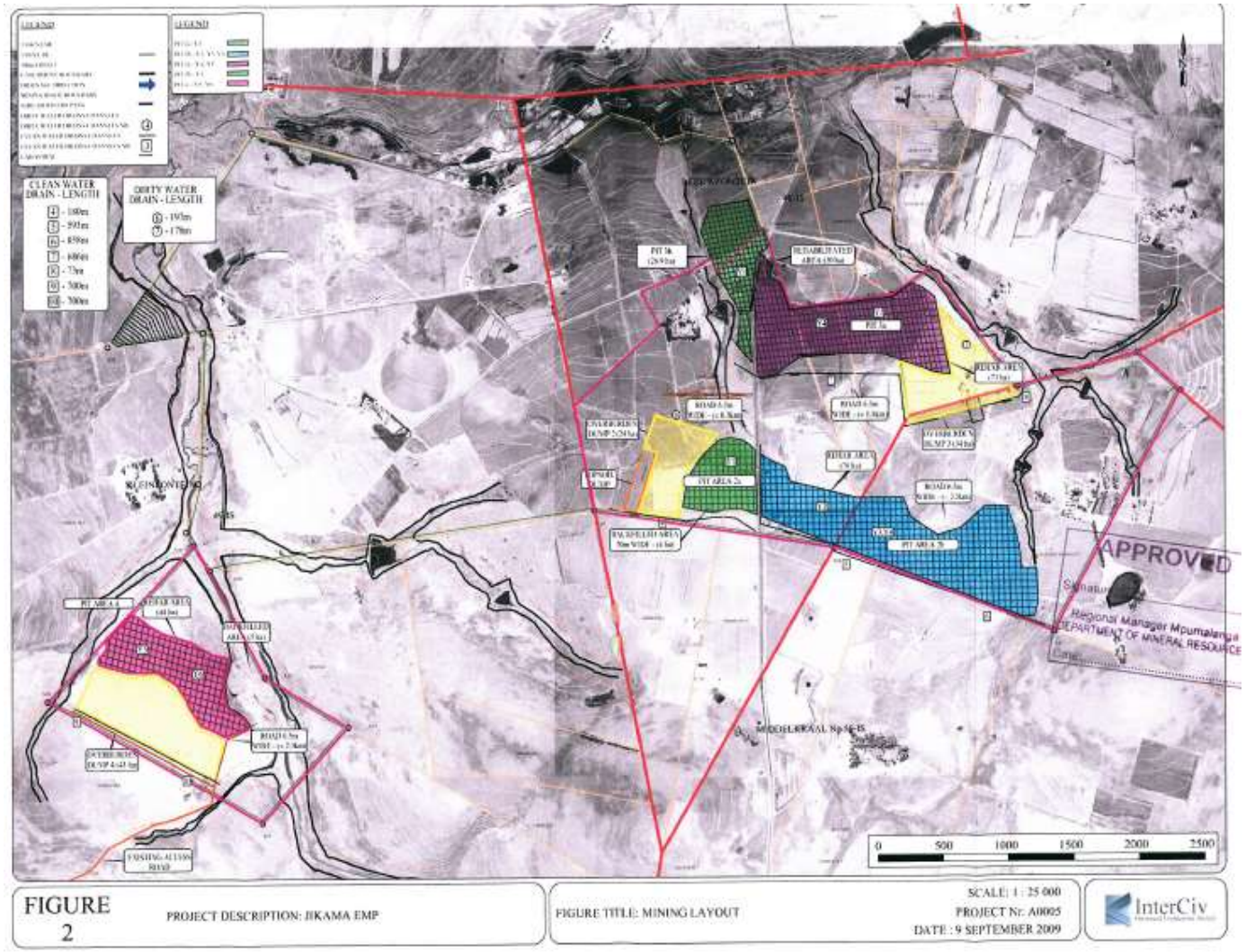


Figure 12: Approved Mining Layout

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.

- **Mineral**: Coal (Bituminous Coal). Possible Pseudocoal and Torbanite will be mined if encountered.
- **Mining Method:** Opencast "Rollover Method".
- Depth of mineral below service: Depth of the lower coal seams varies from 15 to 55metres but could be up to 65 metres in isolated areas.
- **Geological Formation:** Coal bearing strata of the Witbank Coalfield as contained within the Vryheid Formation of the Ecca Group. The Vryheid formation varies from 60m to 200m in thickness in the area and consists of alternating sandstones and shales.
- **Product Market:** Eskom with the target of providing premium Eskom spec of 22.5MJ/kg CV (Calorific Value).
- **Life of Mine:** 10 years.
- **Life of Mine ROM Tonnage**: 15 000 000 ton
- **Annual Production:** 1 500 000 ton
- **Coal Transport System:** Opencast – Haul trucks.

Existing infrastructure on site includes roads, a crusher, a beneficiation plant, a workshop area, stockpiles, a change house, offices, and 2xpollution control dams and associate canals.

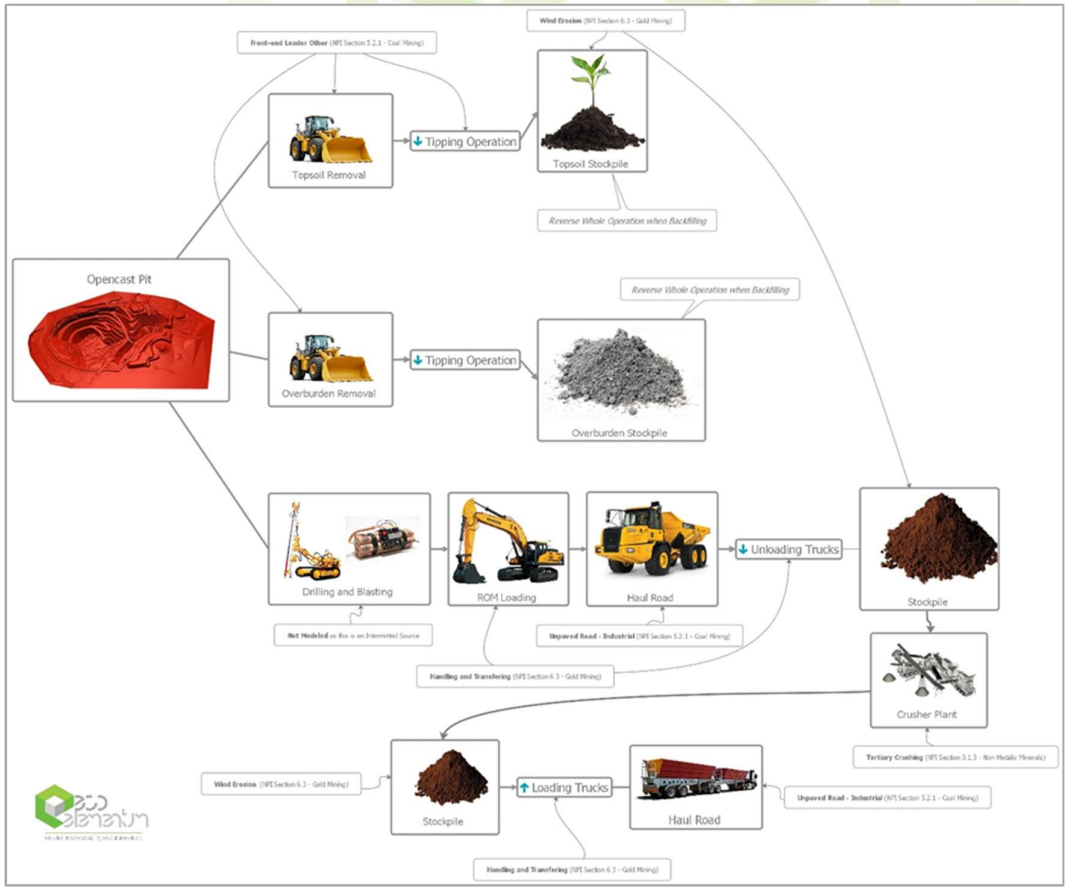


Figure 13: Kleinfontein Colliery Mining Process

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 project triggers the following activities (Table 13 below)

Table 13: Listed and Specified 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	Aerial extent of the Activity Ha or m²	Waste Management Authorisation
GNR 983/GNR 327– Listing Notice 1:	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 will be stored, within a surface dam / sump for use within the process.**	12-20ha	N/A
	27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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:** ***New open pit areas within the extension area including associated infrastructure (excavations, storm water control measures, new PCDs etc.)*** **Although heavily modified – moderately modified in terms of the Mpumalanga Biodiversity Sector Plan (due to existing activities, the site is considered sensitive as a result of the Vulnerable/Endangered classification of the Eastern Highveld Grassland)**	12-20ha	
	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:** ***New open pit areas within the extension area including associated infrastructure (excavations, storm water control measures, new PCDs etc.)*** Although heavily modified – moderately modified in terms of the Mpumalanga Biodiversity Sector Plan (due to existing activities, the site is considered sensitive as a result of the Vulnerable/Endangered classification of the Eastern Highveld Grassland)	12-20ha	

GNR 985/GNR 327– 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:** **Although heavily modified – moderately modified in terms of the Mpumalanga Biodiversity Sector Plan (due to existing activities, the site is considered sensitive as a result of the Vulnerable/Endangered classification of the Eastern Highveld Grassland)**	12-20ha	
	17	***Activity 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:** ***New open pit areas within the extension area including associated infrastructure (excavations, storm water control measures, new PCDs etc.)*** Section 102 EMP Amendment required in terms of the MPRDA	12-20ha	
	21	**Omitted from Listed Activities of 2017**		
GNR 324 (Listing 3)	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;**	12-20ha	

		(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:** **Although heavily modified – moderately modified in terms of the Mpumalanga Biodiversity Sector Plan (due to existing activities, the site is considered sensitive as a result of the Vulnerable/Endangered classification of the Eastern Highveld Grassland)**		
	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:** **Although heavily modified – moderately modified in terms of the Mpumalanga Biodiversity Sector Plan (due to existing activities, the site is considered sensitive as a result of the Vulnerable/Endangered classification of the Eastern Highveld Grassland)**	12-20ha	
	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—	12-20ha	

		(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:** **Although heavily modified – moderately modified in terms of the Mpumalanga Biodiversity Sector Plan (due to existing activities, the site is considered sensitive as a result of the Vulnerable/Endangered classification of the Eastern Highveld Grassland)**		

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

4.3.1 Project Overview

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) that Kleinfontein Mining Holdings proposes to amend their current approved EMPs (Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM, Jicama MR - MP 30/5/1/2/2/318 MR) in order to conduct additional open cast mining on their Kleinfontein Colliery properties. Eco Elementum (Pty) Ltd has been appointed by Kleinfontein Colliery (Pty) Ltd to undertake the section 102 EMP Amendment and Integrated Water Use License Application for the Jicama opencast mining area to include various extensions of existing approved opencast mining blocks and related mining infrastructure required to mine the areas in a responsible manner while giving effect to environmental and water resource protection ensuring minimal impacts through effective management. During further invasive drilling and exploration activities on the Jicama mining area new geological information became available which resulted in the mining layouts to be altered to ensure optimal mining and utilisation of the available coal resources. This application therefore serves to seek approval for the revised mining layout. The total approved mining area of Kleinfontein Colliery is 2968,851 hectares (ha).

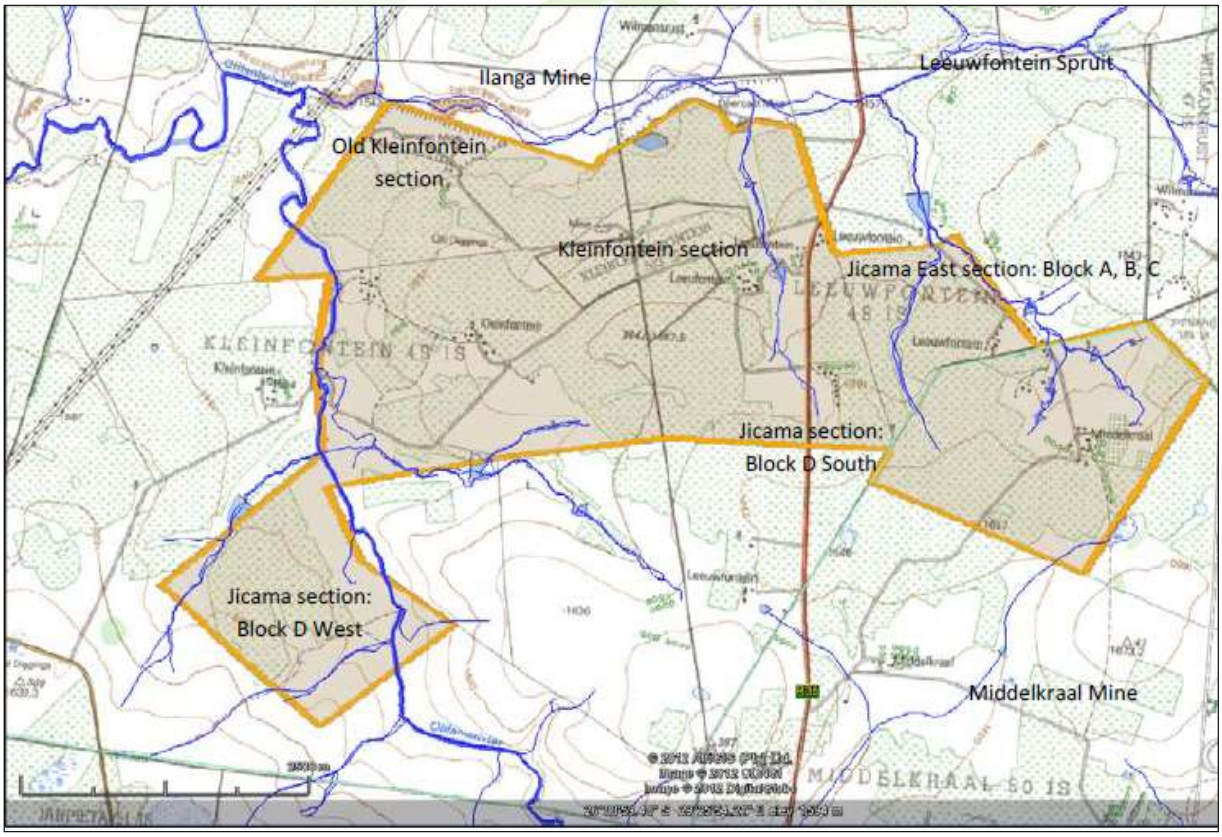


Figure 14: Extent of Kleinfontein Colliery Properties

4.3.2 Mineral Reserve and Marketing Strategy

The coal seams are correlated to the Witbank and Highveld Coalfields successions. The predominant and economic seams present in the area include the No. 1, 2 and 4 seams. The No. 3 and 5 seams are in general absent in the area of interest. Eskom with the target of providing premium Eskom spec of 22.5MJ/kg CV (Calorific Value)

4.3.3 Description of seams of economic value

#4U Seam

The No.4U seam is well developed over the resource area. It has an average mineable thickness of 1.8 metres. The coal qualities are poor due to interbedded shale and sandstone bands and the coal should be de-stoned for possibly the Eskom market. The roof consists mainly out of a thick, medium grained, white sandstone layer which would form a fairly competent roof in the case of an underground mine.

#4L Seam

This seam lies underneath the No.4U seam and in most cases, a thin mudstone/shale parting (±1m) separates these two seams from each other. This seam forms about 40% of the total resource tonnages in the area. Mudstone in-seam partings are sometimes present in the upper part of the No.4L seam. These layers have a raw ash content of well over 40% and were excluded in the selection of mineable seam thickness. Roof conditions generally are poor because of the overlying mudstone and shale bands between the 4U and 4L seams.

#2 Seam

The No.2 seam lies about 15-20 metres below the No.4L seam. It contributes roughly about 60% towards the total resource tonnages. Dolerite intrusions and the effects thereof also played a major role when defining the seam boundaries. The strata between the 4L and 2seams consist mainly out of sandstone and shale layers with the shale predominantly towards the base. Total thickness of up to 9 meters were intersected by boreholes but that includes layers of shale and shaly sandstone. These layers, which occur mainly towards the top of the seam, were excluded where it exceeds an Ash content of 40%. These layers will form the roof in the case of an underground mine operation. The selected horizon has an average thickness of 3.45 m and the coal qualities vary from medium to high in places. The seam has a good export potential as well as a medium to high places. This seam has good export potential as well as a middling's product for power generation on the local markets.

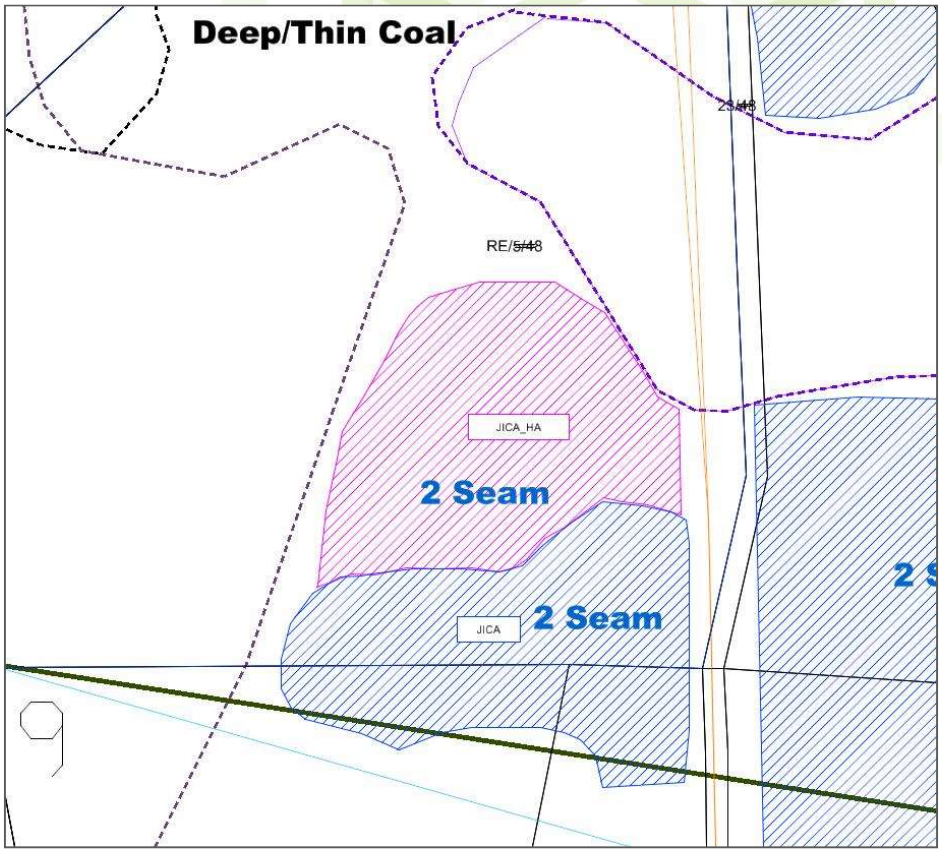


Figure 15: Jicama South resource blocks – west of the tar road

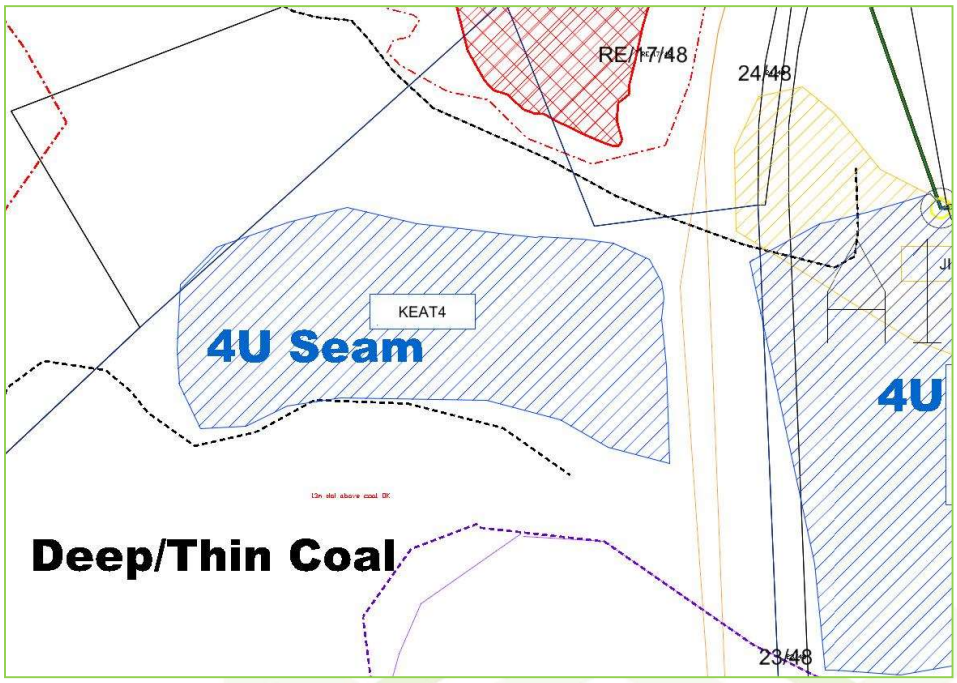


Figure 16:Keaton 4 seam resource block

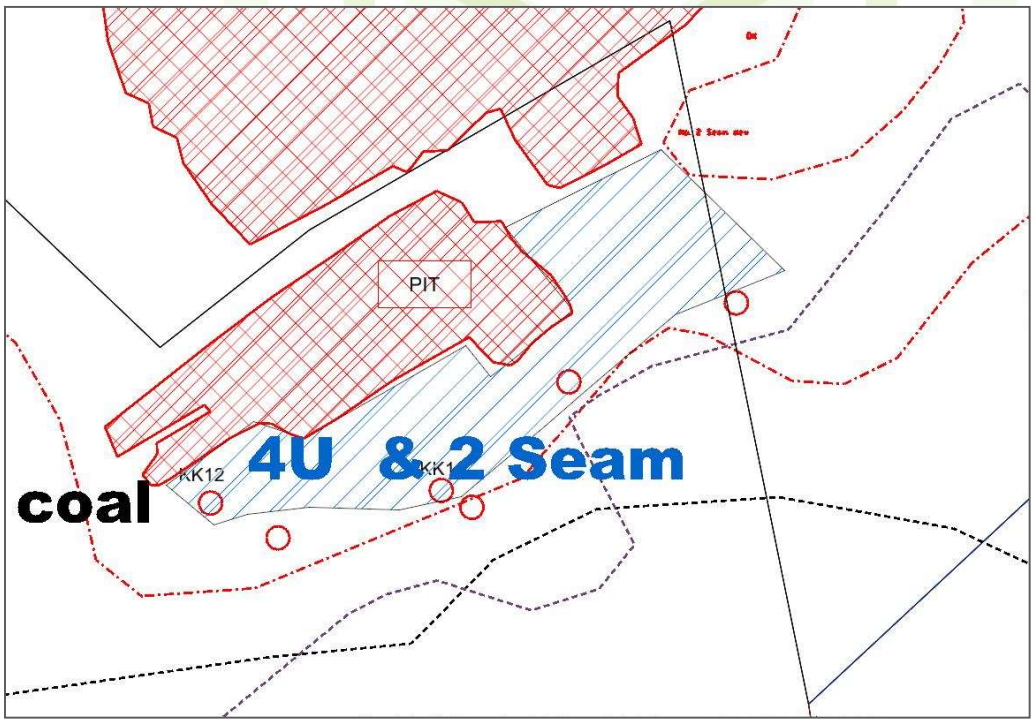


Figure 17: Kleinfontein Resource Block

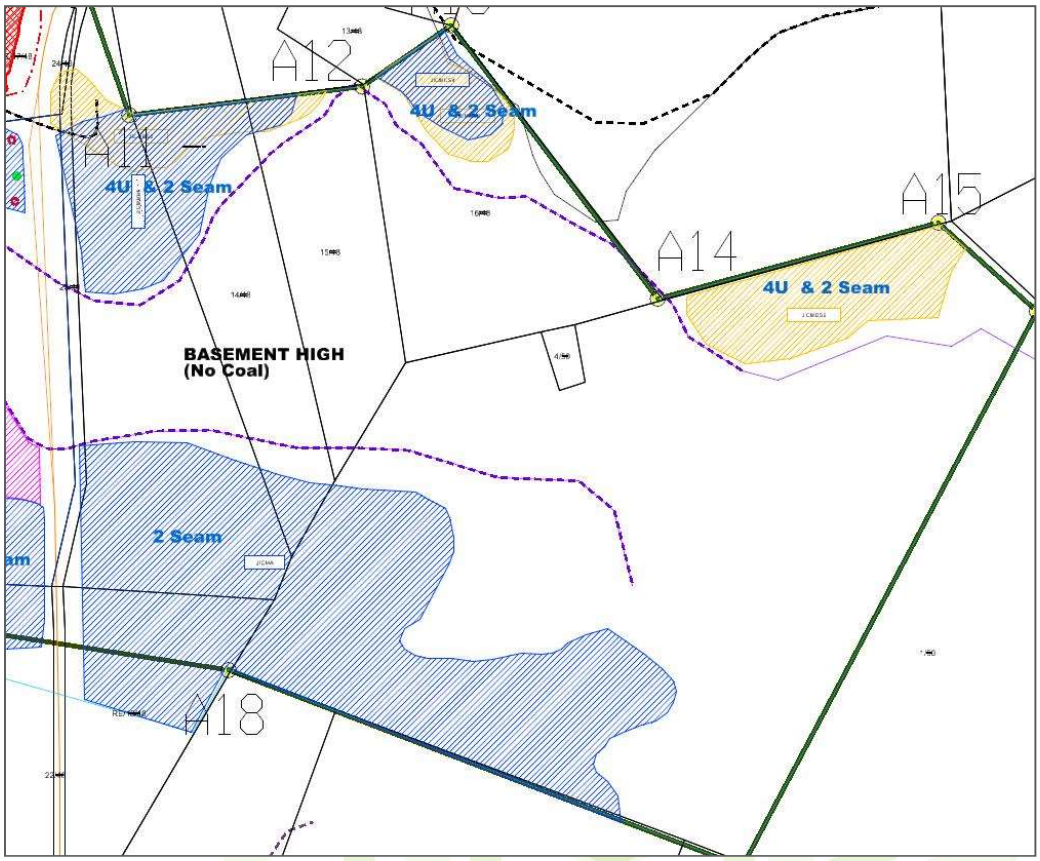


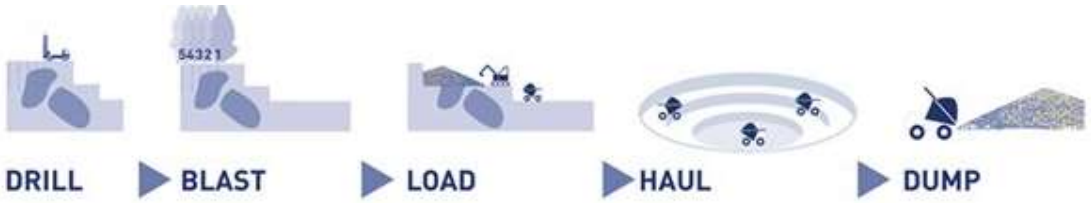
Figure 18:JICAMA Resources (East of the tar road)

4.3.4 Opencast Mining and Coal Processing Method

Mining is conducted via opencast method by employing truck and shovel rollover mining technique. Strips of 45 m wide is mined at a time. Box cuts are developed to gain access to the opencast workings. Burden material will be moved back into the pit in order to fill the voids and only the topsoil removed from subsequent strips will be used to dress the levelled spoils as part of the rehabilitation programmes. Loading of the coal takes place within the pit, with the crushing, sizing and washing of the coal taking place at the relevant infrastructure areas on site. Blasting holes are marked out and drilled according to the pre-designed blasting depth. Blasting is undertaken using an ammonium-nitrate and diesel-based explosive, which is delivered to site as the need arises, and there is thus no on-site storage of explosives. Blasted overburden is loaded with an excavator/front end loader onto trucks that transports the overburden material to a void opencast mine. Surface mining of coal is conducted in a relatively simple sequence of operations (or sub-systems) which includes:

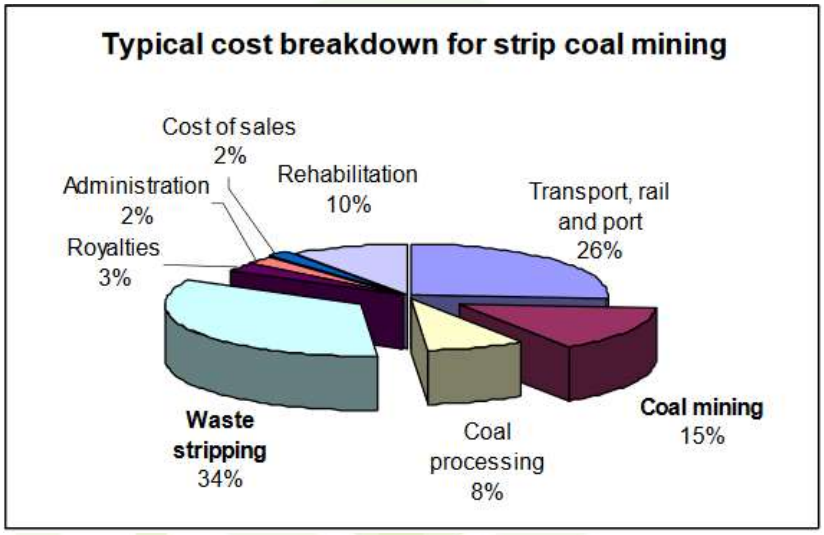
1) preparing the surface,
2) drilling,
3) blasting,
4) overburden removal,
5) loading the deposit,
6) haulage of the mined deposit, and
7) rehabilitation.

Mining techniques for a particular region are largely dictated by geologic and topographic conditions. Even where the techniques are generally comparable, economics of alternative equipment choices and utilisation are not easy to generalize.

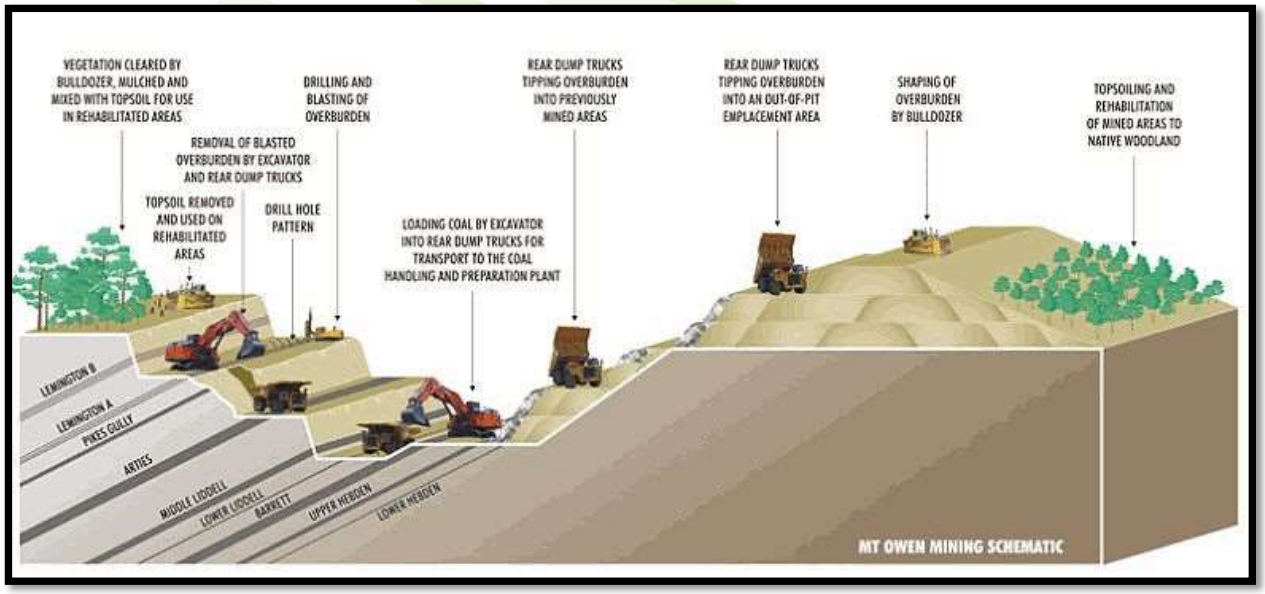


Advantages of open-pit mining include:

1. Powerful trucks and shovels can be used to move large volumes of rock.
2. Equipment not restricted by the size of the opening you are working in.
3. Faster production.
4. Lower cost to mine means lower grades of ore are economic to mine.



The simple graphic below displays the sequence of events for the open-pit mining cycle.



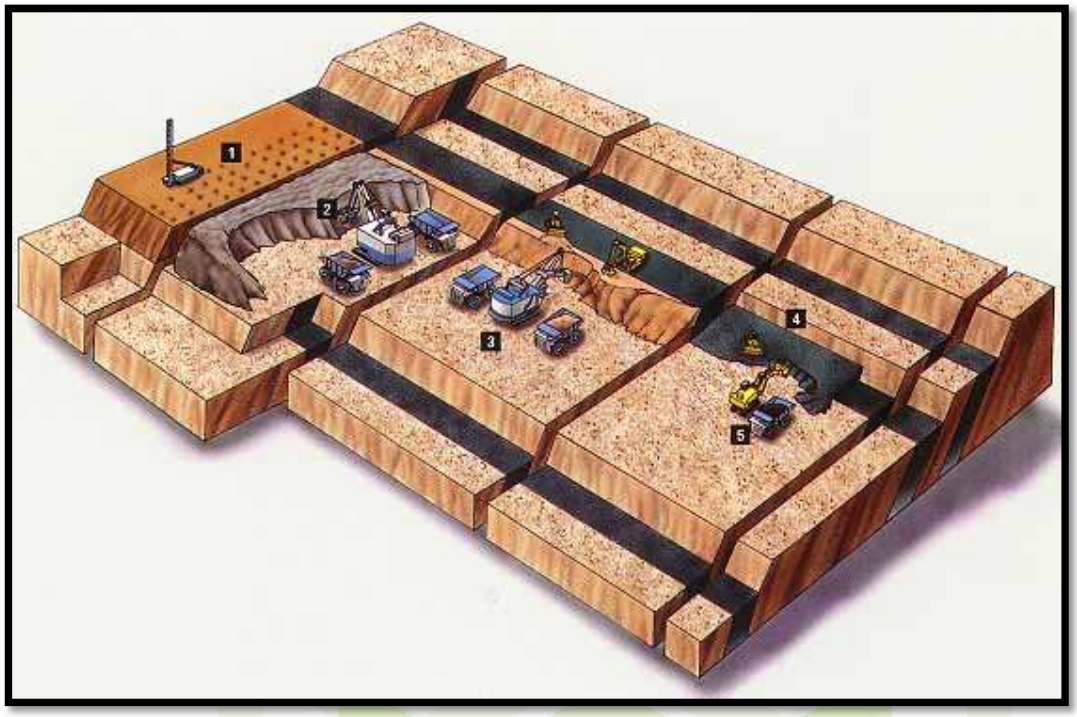


Figure 19: Kleinfontein Opencast Mining Process Diagram

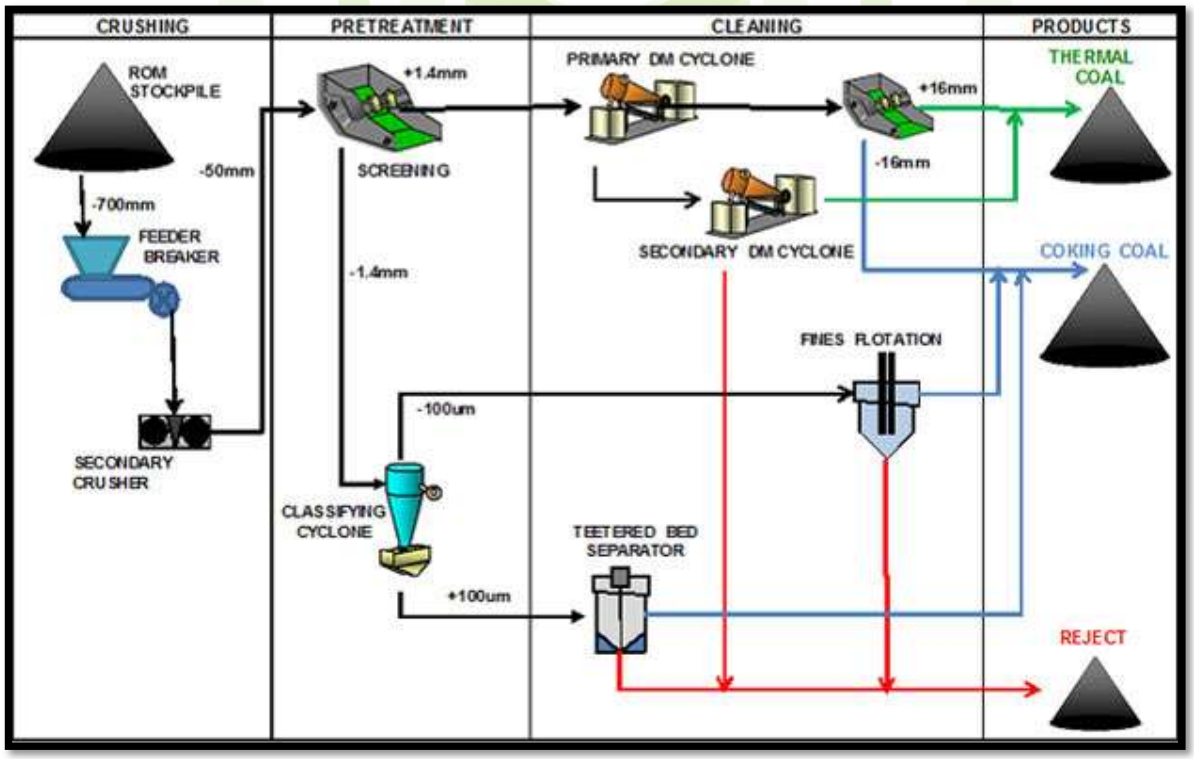
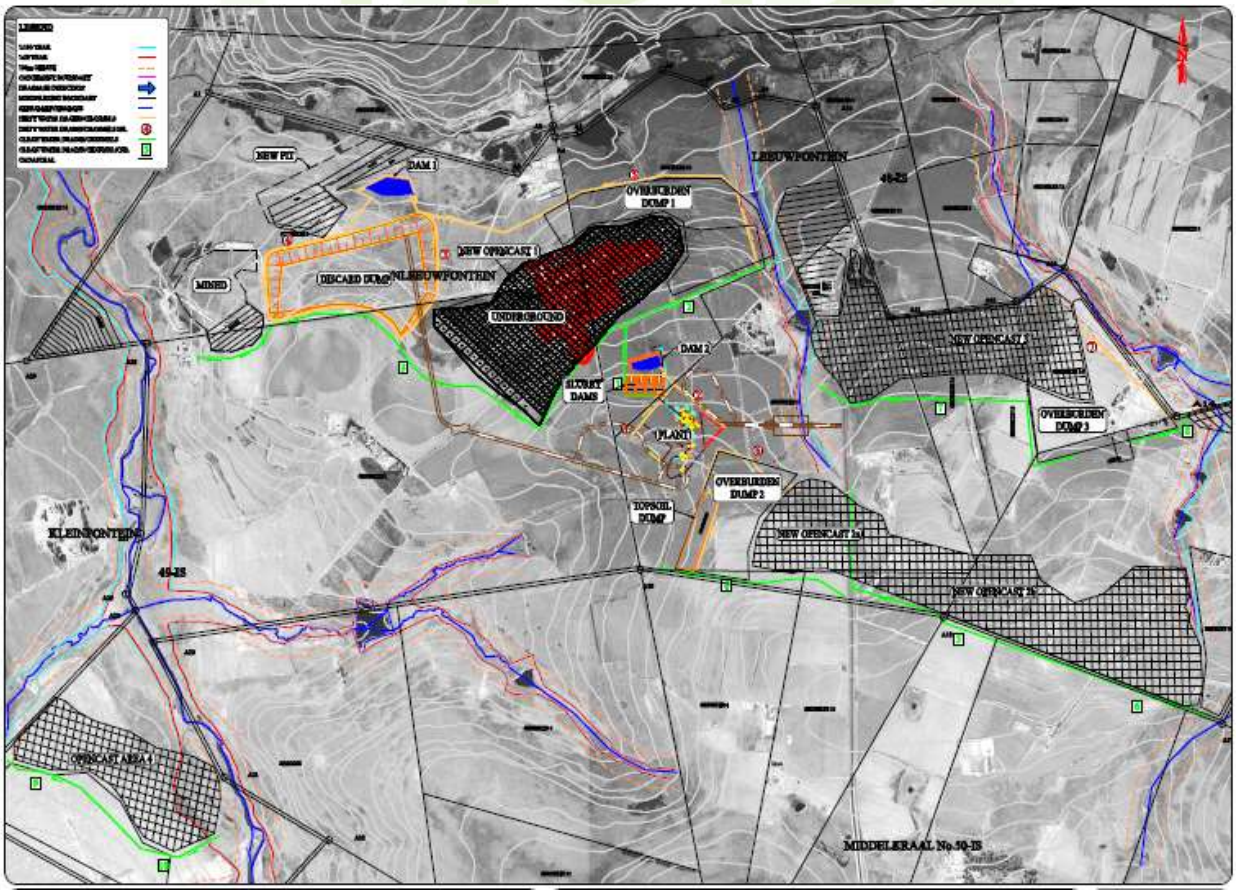


Figure 20: Coal Processing Diagram

4.3.5 Surface Infrastructure

Existing approved EMP infrastructure include:

- Mine offices;
- Workshop and contractors workshop;
- Weighbridge;
- Security hut;
- Change house
- Explosives magazines;
- Coal (Product)l stockpiling area;
- Opencast Pits
- Pollution Control Dams (i.e. Pollution Control Dams D3 and D4)
- Crushing and Screening Plant
- Beneficiation Plant (located at the crusher);
- Mineral processing plant for purposes of meeting coal washing requirements on site ("Washplant")
- Access and haulage roads and powerlines;
- Solid waste management facilities in the form of skips;
- Mine and residue disposal site, which comprise of overburden
- Run of Mine Stockpiles
- Discard Stockpile
- Slurry disposal/stockpiling
- Waste management facilities
- Housing, recreation and other employee facilities; and
- Water supply and sanitation power supply



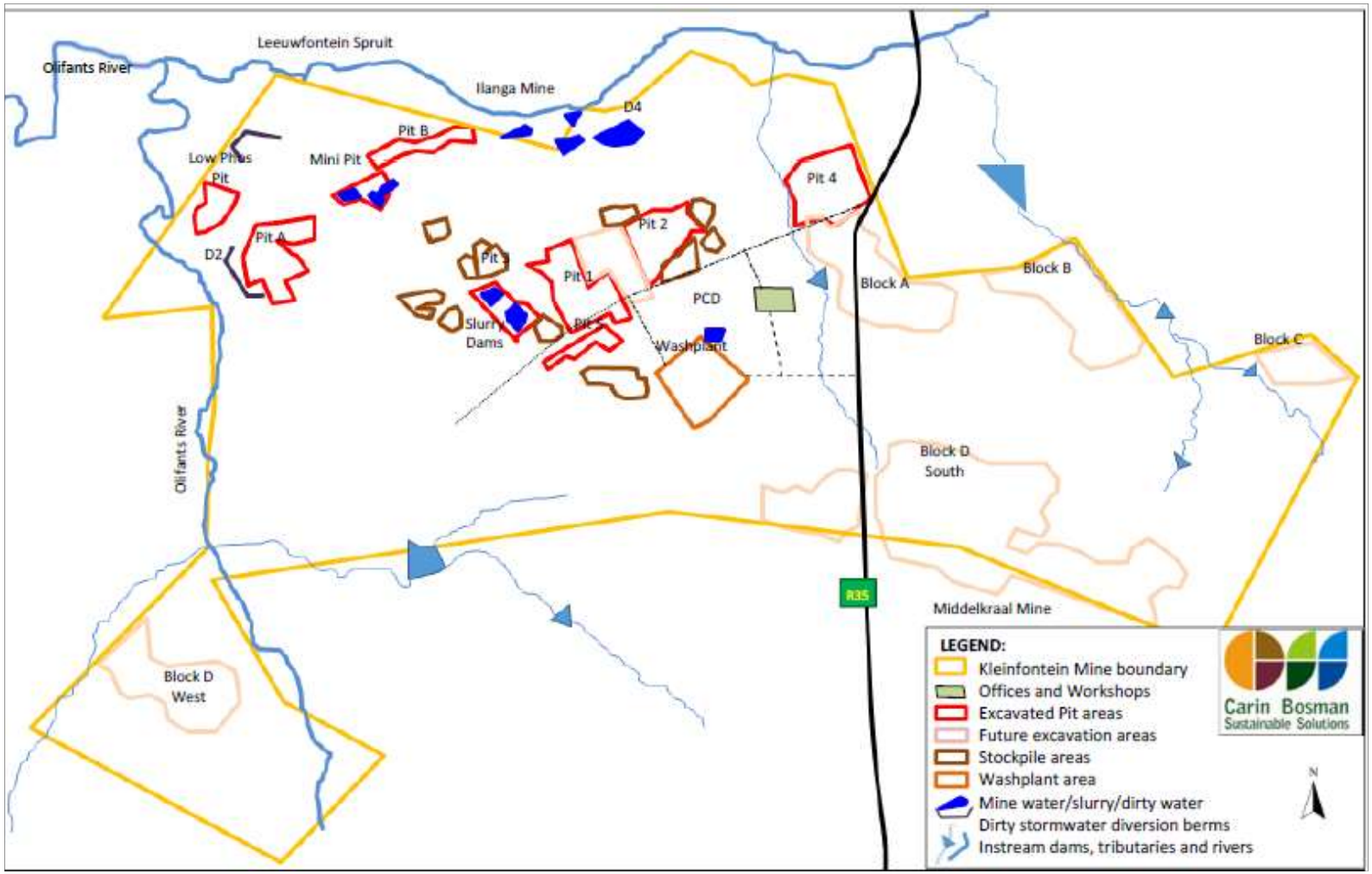


Figure 21: Existing Infrastructure Layout

4.3.6 Existing 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):

- **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 total dirty water catchment areas is calculated as 3.42 km^2 (342 ha).
- **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. All areas upstream of the mining blocks have been classified as clean catchments

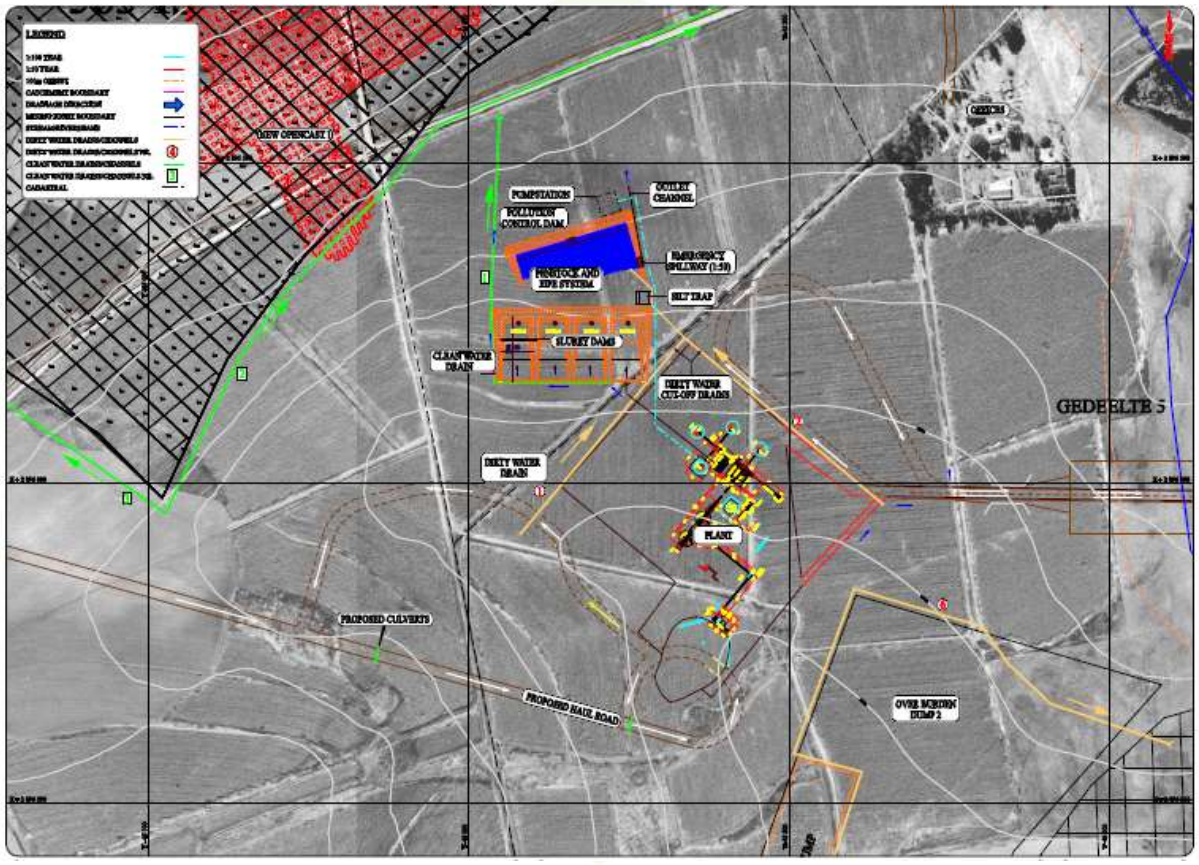


Figure 22: Existing Process Water Management System

4.3.7 Dirty Water Areas of the Mine and Pollution Management Infrastructure

The following areas has 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

The dirty water runoff from the above areas catchment is directed towards a HDPE (High-density polyethylene) lined PCD. The purpose of the PCDs is store process water for re-use in the plant and mining area.

Dirty water management infrastructure on site include:

- Concrete-lined drainage channels
- Dirty water culverts
- Stormwater retention dam
- Sumps
- Return Water Dams
- Interception trenches; and
- Diversion berms

Contaminated run-off from the current operational excavation and disposal areas is retained in 6 ha of contaminated stormwater dams, namely D1, D4, and in the void of Pit B in the Old Kleinfontein section. To accommodate contaminated run-off from the new excavation and disposal areas, as well as to collect future decant, it is envisaged that an additional Stormwater Control Dam will be constructed, down-gradient from the future Otto Block and Block A. The design of new Stormwater Control Dams will be in accordance with the conceptual designs based on the BPG's as endorsed by the DWS

4.3.8 Pollution Control Dam (Return water dam)

The current operational process water management system entails pumping dewatering water from the active excavation areas for use at the washing; and returning any wastewater and slurry from the Washing Plant to the new Pollution Control Dam (PCD), from where it is re-used in the Washing Plant. Approximately 8% of the coal feed to the plant is retained as slurry. For the current coal feed of 80,000 t/m, the monthly volume of slurry produced is thus 6,400t/m, and based on a slurry density of 1.2, this converts to approximately 5,333 m3/month. For the future coal feed to the plant of 260,000t/m, the monthly volume of slurry will be 20,800t/m, or 16,000 m3/month. Refer to Table 14 for a detailed description of existing pollution facilities.

Table 14: Existing Pollution Control Facilities

Facility	Purpose	Footprint (m^2)	Rate/Capacity (m^3)	Current Volume (m^3)	Location
Slurry Dam A	Stores slurry water from the Washing Plant in Pit C, slurry supernatant is used as process water as well as dust control.	5,229,238	120,000 m^3/a	130,730	26°9'59.24" S 29°26'24.36 "E
Slurry Dam B	Stores slurry water from the Washing Plant in Pit C, and slurry supernatant is used as process water and for dust control.	12,812.7	80,000 m^3/a	371,567	26°10'3.48" S 29°26'28.75 "E
Pit B	Stores contaminated stormwater originating from Old Kleinfontein, Kleinleeuwfontein/	60,260	18,400.6 m3/a	240,600	26° 9'29.95"S 29°26'7.92" E
Leeuwfontein sections					
D1	Capture contaminated stormwater downgradient of Old Kleinfontein section (Low Phos Pit, Mini Pit, Pit A and Pit B, Discard Stockpiles # 17 & 18)	33,009.7	49,513 m^3	0	26° 9'30.16"S 29°25'22.92 "E
D3	Capture contaminated wash water and stormwater down-gradient of Washing-plant	4,846.8	595,000 m3/a	5,846	26°10'11.86 "S 29°27'15.51 "E

D4	Capture contaminated stormwater downgradient of Kleinleeuwfontein and Leeuwfontein sections (Pit 1 and Pit 2, [Discard Stockpiles # 2, 3, 4, 5, 11, 12, & 13]	3,548.08	11,345	6,786	26° 9'23.51"S 29°26'56.16 "E
D5	Future PCD to capture contaminated stormwater and future decant down-gradient of Otto Block.	To have 5,000m^2 footprint	To have 12,000 m^3 capacity	0	26°11'31.52 "S 29°25'22.40 "E
D6	Future PCD to capture contaminated stormwater and future decant	To have 5,000m^2 footprint	To have 12,000 m^3 capacity	0	26° 9'26.57"S 29°27'39.43 "E

4.3.9 Clean Water Areas of the Mine

Stormwater run-off within identified 'clean' catchments are intercepted by diversion channels and/or earth berms which divert away from the mining area, to be discharged to the existing watercourses. Regulation 704 of the Water Act requires that all clean water be diverted from dirty areas for al storm magnitudes up to the 1:50 year, 24hr storm event. The act also requires that dirty water areas be contained and stored with zero spillages for all storm magnitudes up to the 1:50 year, 24 hr storm event. Therefore, all channels, berms, drains and dams is designed to retain/discharge runoff (clean and dirty) with a capacity equalling the 1:50year peak runoff or 24hr storm event (whichever case is worse).

4.3.10 Proposed Dirty Water Management Infrastructure

In order to comply with Regulation 704, new storm water management infrastructure has been designed to ensure separation of clean and dirty water. The system will ensure that dirty water is contained within the dirty water system and the clean water, generated from the catchment upstream of dirty areas, will not enter the dirty system. The dirty water containment systems, and clean water diversion systems have conceptually been designed for a fifty-year (1:50) reoccurrence period. The following surface water infrastructure will be required for each of the mining blocks:

Table 15: New PCD Summary

Contributing Catchment	PCD Name	Catchment Area (ha	SCS Storage Required (m3)	Rational Storage Required (m3)	Required PCD Capacity (m3)	Target PCD Capacity (m3)
Dirty Catchment DAD	PCD A & D (Western)	108,45	53773	34735	53773	54 000
Dirty Catchment_DB1	PCD B	4,39	2176	4559	4559	5 000
Dirty Catchment_DD2 (East)	PCD D (Eastern)	26,0	12910	12658	12910	13 000
Dirty Catchment DE	PCD E	19,4	9609	7038	9609	10 000
Dirty Catchment	PCD F	8,6	4257	2622	4257	5 000

The PCDs will be lined with a 1.5 mm HDPE liner, placed on a geotextile (Bidim A4 or similar). 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. In order to prevent seepage, and groundwater contamination, the PCDs all have a Class-C barrier (liner). The PCDs also have a minimum freeboard of 800 mm and lined emergency overflows capable of safely passing the 1:100-year flood event.

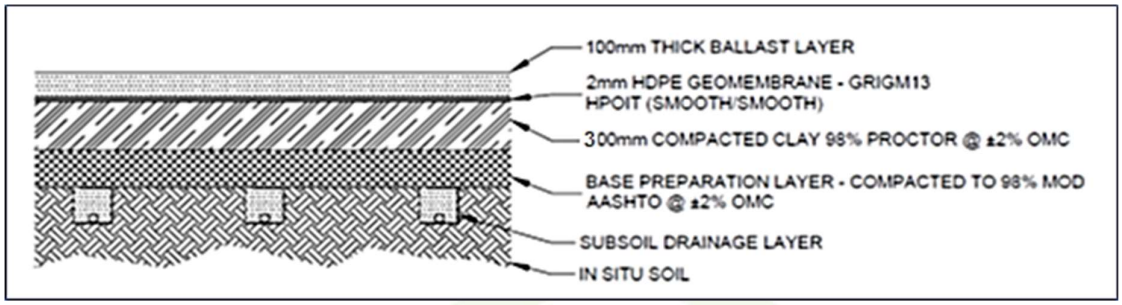


Figure 23: PCD Liner Details

The larger PCD will be provided with silt traps up stream of the inlets and the smaller PCDs will also act as silt traps. The main function of the silt traps is to remove suspended solids entrained in the dirty water runoff, preventing high volumes of sediment transport into the PCDs. Silt traps will be sized based on the characteristics of the coal being mined in the area. Furthermore, the silt trap will be designed to be able to be operational to a 1:10 year storm water events. For storm events between 1:10 and 1:50 year return an emergency spillway into the relevant PCD will be included to protect the silt trap and adjacent infrastructure from damage during storm events.

4.3.10.1 Block A & D (Western) PCD

The proposed Block A & D Western Portion PCD will collect and contain all water that runs off from the mining Block A & D Western portion and will have a total capacity of approximately 54 000 m3. The PCD will be located on the northern corner of block A. The layout of the proposed PCD is shown on DWG. 17-337-SWM-20 included in Annexure 10 (sub-Annexure B).

4.3.10.2 Block B PCD

A wetland is situated in-between block A and B. Therefore, it is proposed that a PCD is constructed for block B to collect and contain all dirty water that is generated within mining Block B. The proposed PCD will have a total capacity of approximately 5 000 m3. The PCD will be located on the north western corner of block B. The layout of the proposed PCD is shown on DWG. 17-337-SWM-40 included in Annexure 10 (sub-Annexure B).

4.3.10.3 Block D (Eastern) PCD

As at block B, a wetland is situated in-between block D western and eastern portions. Therefore, it is proposed that a PCD is constructed for block D to collect and contain all dirty water generated within mining Block D western portion. The proposed PCD will have a total capacity of approximately 13 000 m^3. The PCD will be located on the north western corner of block D. The layout of the proposed PCD is shown on DWG. 17-337-SWM-30 included in Annexure 10 (sub-Annexure B).

4.3.10.4 Block E PCD

It is proposed that a PCD is constructed for block E to collect and contain all dirty water generated within mining Block E. The proposed PCD will have a total capacity of approximately 10 000 m^3. The PCD will be located downstream of block E north of the existing clean water cut-off channel. The layout of the proposed PCD is shown on DWG. 17-337-SWM-50 included in Annexure 10 (sub-Annexure B).

4.3.10.5 Block F PCD

It is proposed that a PCD is constructed for block F to collect and contain all dirty water generated within mining Block F. The proposed PCD will have a total capacity of approximately 5 000 m^3. The PCD will be located downstream of block F in a suitable location. The layout of the proposed PCD is shown on DWG. 17-337-SWM-60 included in Annexure 10 (sub-Annexure B).

Run-off for the dirty water portions drain in a general northerly direction. In order to contain the dirty water generated from the mining areas, dirty water collection channels will be provided along the perimeter of the dirty areas to convey the dirty water into the applicable silt trap and PCD. The channels will collect the dirty runoff generated from the site and convey it to the pollution control dams. Silt trap will be provided at the outlet of the channels, upstream of the PCDs. Approximate sizing of the dirty water collection channels are presented in **Error! Reference source not found.**.

Table 16:Summary of design criteria for the dirty water diversion structures

Section Name	Channel Length (m)	Channel Width (m)		Side Slope H/V (m/m)	Channel Depth	Channel Type	Lining	Capacity (m^3/s)
		Bottom	Top		(m)			
D01_01	1995	0,5	3,7	2,0	0,8	TRAPEZOIDAL	Concrete Lined*	6,421
D01_02	2785	0,5	3,7	2,0	0,8	TRAPEZOIDAL	Concrete Lined*	6,421
D02_01	765	0,0	2,8	2,0	0,7	V-DRAIN	Concrete Lined*	1,993
D02_02	755	0,0	2,8	2,0	0,7	V-Drain	Concrete Lined*	1,993
D03_01	1650	0,5	3,3	2,0	0,7	TRAPEZOIDAL	Concrete Lined*	3,181
D03_02	455	0,0	2,8	2,0	0,7	V-DRAIN	Concrete Lined*	1,993
D04_01	1310	0,0	2,4	2,0	0,6	V-DRAIN	Concrete Lined*	1,226
D04_02	845	0,0	2,4	2,0	0,6	V-DRAIN	Concrete Lined*	1,226
D05_01	672	0,0	2,0	2,0	0,5	V-DRAIN	Concrete Lined*	0,676
D05_02	595	0,0	2,0	2,0	0,5	V-DRAIN	Concrete Lined*	0,676

4.3.11 Proposed Clean Water Diversion Infrastructure

In terms of Regulation 704 the clean water runoff arising within the catchment of the Kleinfontein Mine is required to be diverted and returned to the natural watercourse. The topography, natural watershed and site location need to be carefully considered in the design of canals, berms and PCD to separate clean water from dirty water. Six clean water catchments have been identified upstream of the mining blocks. The clean water run-off from these areas will be diverted past the mining blocks and discharged into the natural environment downstream

of the mining areas. The clean water channels will be grass-lined and the design include rock check dams for sections with flow velocities in excess of 1 m/s. The outlet of the channels will be provided with an energy dissipating structure, as well as Reno mattresses downstream of the outlet in order to limit any erosion. These channels and check dams should be inspected and maintained at regular intervals or after every rainfall event. A roughness of 0.015 denotes a channel lined with concrete while a roughness of 0.035 denotes a grass lined channel, which is maintained, where the grass is cut regularly. It is expected that the grass lined clean water channels will be used where the slope allows and that grass lined channels along with rock check dams will be constructed where the gradient would cause erosion of the channels. All channel sizing was done for grass channels.

The clean water diversion channels required to divert run-off up to the 1:50 year 24-hour storm water runoff volume are presented in Table 17

Table 17: Summary of design criteria for the clean water diversion structures

Section Name	Channel Length (m)	Channel Width (m)		Side Slope H/V (m/m)	Channel Depth	Channel Type	Lining	Capacity (m^3/s)
		Bottom	Top		(m)			
C01_01	346	1,0	6,4	3,0	0,9	TRAPEZOIDAL	Grass Lined	3,23
C02_01	540	1,0	4,6	3,0	0,6	TRAPEZOIDAL	Grass Lined	2,65
C03_01	998	0,5	4,1	3,0	0,6	TRAPEZOIDAL	Grass Lined	1,99
C04_01	950	0,5	4,1	3,0	0,6	TRAPEZOIDAL	Grass Lined	1,99
C04_02	568	0,0	3,6	3,0	0,6	V-DRAIN	Grass Lined	1,36
C05_01	842	1,0	4,6	3,0	0,6	TRAPEZOIDAL	Grass Lined	2,70

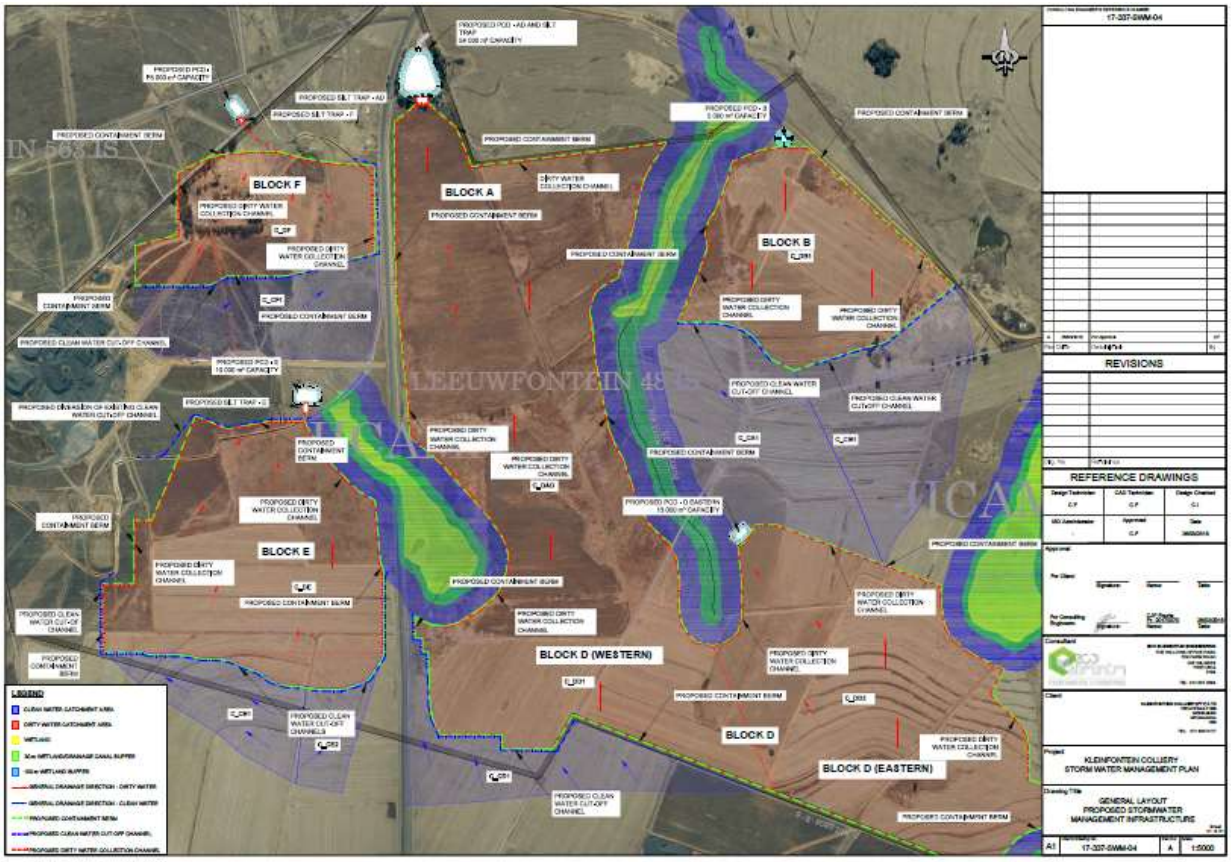


Figure 24: Proposed Water Management Infrastructure

4.3.12 Coal and Rock Handling

The overburden/soils are stripped and stockpiled for use in the final void and is protected against erosion (through climatic conditions such as water and wind) and compaction. Loading of the coal takes place within the pit, with the crushing, sizing and washing of the coal taking place at the washplant on site

4.3.13 Crushing and Screening

A ROM tip feeding mechanism is employed at the crushing and screening. The coal is loaded and hauled to the ROM coal stockpile, from where it is sent to the crushing and screening plant. Coal quantity and quality is monitored daily for moisture, ash, volatility, fixed carbon, calorific value and sulphur.

4.3.14 Mine Residue Disposal and Stockpile Areas

The first step of the opencast mining involves the removal and stockpiling of topsoil where after the softs will be removed and stockpiled.

Overburden consists of various types of sedimentary rocks. There is limited discard dump created by the mining operations as overburden created by the opencast operations are placed backed in to the opencast voids as part of the roll-over mining method employed. Carbonaceous shale/material is placed back into the void within the carbonaceous zone and below the groundwater level when/where possible. Overburden and/or topsoil is then used to cover the discard dump within the shortest timeframe possible to reduce the discard's exposure to oxygen (which could lead to the potential acid generation).

4.3.15 Slurry Dams

Coal that is washed on site and slurry that is generated from the process is stored in mined-out excavation areas. Slurry is currently stored in Pit C (see Figure 22 and Figure 25). The pits which have been mined out are backfilled with slurry, discard and/or overburden. Once the material has settled, the site is covered with topsoil and re-seeded/re-grassed

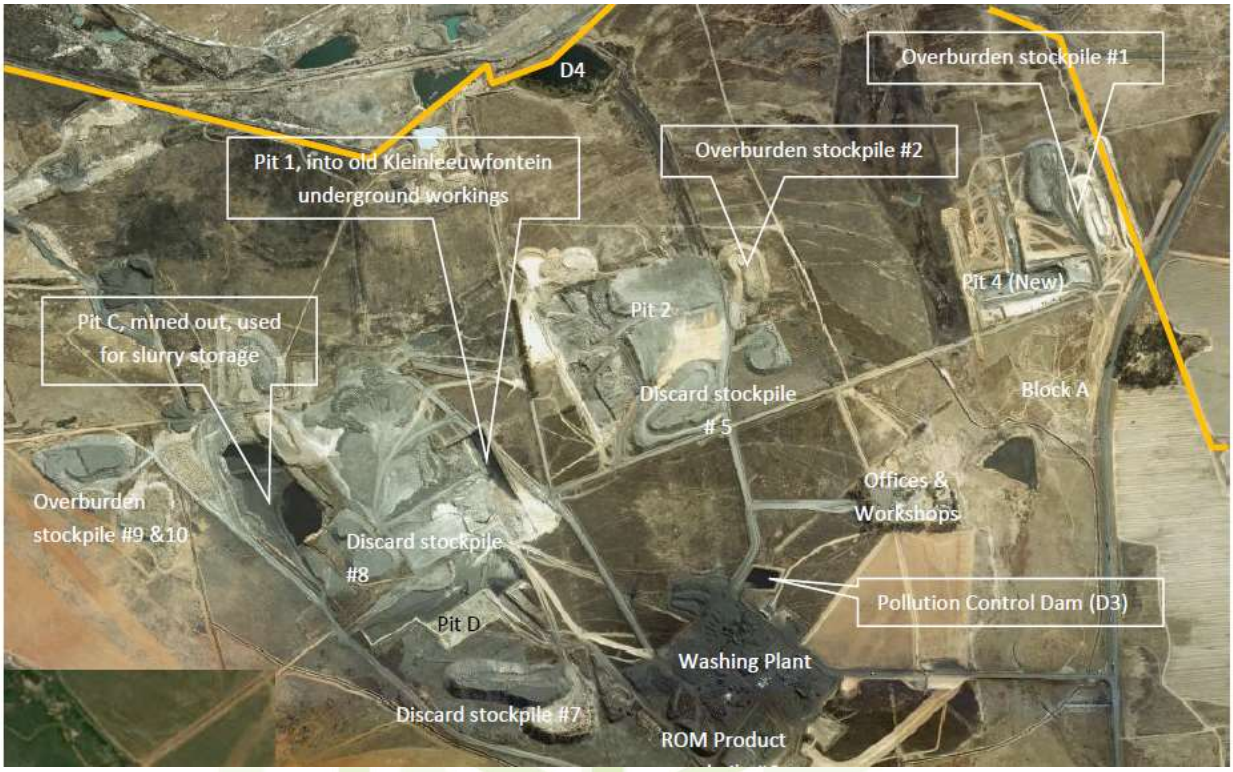


Figure 25: Position of Slurry Dam and Washing Plant

4.3.16 Wash Plant

The washing plant has been constructed on an existing compacted gravel platform prepared specifically to receive and support the coal washing plant and product stockpiling areas. The platform is positioned on the northern side of the water divide and all runoff emanating from the platform area is affected and considered as “dirty”. The runoff from the platform is collected with dirty water drains located along the western and northern boundary of the platform. The drains discharge the affected water into a silt trap, which overflows into the pollution control dam. Refer Figure 25 above.

4.3.17 Coal Beneficiation

Kleinfontein Colliery has approved coal beneficiation plant in operation. The coal beneficiation plant operates on the principle of heavy medium separation and has the ability to treat coal in either a single or double stage separation through three different “streams”. Washed coal is loaded either from the product stockpiles or from the emergency coal stockpile for local and export markets export.

Raw coal can be processed in any of the three different coal processing streams in the plant. The different size fractions obtained during coal washing are treated in either drums (large size fraction), in high-density heavy medium cyclones or in spiral plants. The density employed in the high-density circuit, to achieve the separation between product and discard, is of the order of 1:60 to 1:70 but varies according to changes in raw coal quality and product quality requirements. The washing medium is magnetite that is prepared by the site. Magnetite is recycled by using magnetite separators on the final product streams before going to the product or emergency stockpiles.

The coal discard stream is sent to the discard stockpiles and slurry ponds. Discard may be double staged where the coal is crushed and more of the coal separated from the waste discards rock. Consequently, the solid discards sent to the discards stockpiles are of a smaller size than that typically observed on discard facilities.

4.3.18 Waste Management

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

4.3.19 Concurrent Rehabilitation

Kleinfontein Mine employees a concurrent roll-over rehabilitation process which runs parallel with the mining process. This way a minimum area is exposed at one point in time, the overburden dumps are kept to a minimum, the seedbank in the topsoil stay preserved as it is used quickly for rehabilitation and the overall mine closure liability is significantly reduced (Figure 27). The potential of groundwater contamination is lowered during the on-going rehabilitation process as the recharge potential for unlevelled spoil areas are higher than that for levelled areas. The potential of leachate inside the pit is hereby also lowered.

During the on-going rehabilitation process, the carbonaceous material is placed in the deepest section of the pit below the decant level. This section is always inundated which ensures minimized pyrite oxidation. The pits which have been mined out are backfilled with slurry, discard and/or overburden. Once the material has settled, the site is covered with topsoil and re-seeded/re-grassed.

Refer to Annexure 9 for the Rehabilitation and Closure Report for more detailed information

Figure 26: Pit A (Rehabilitated)

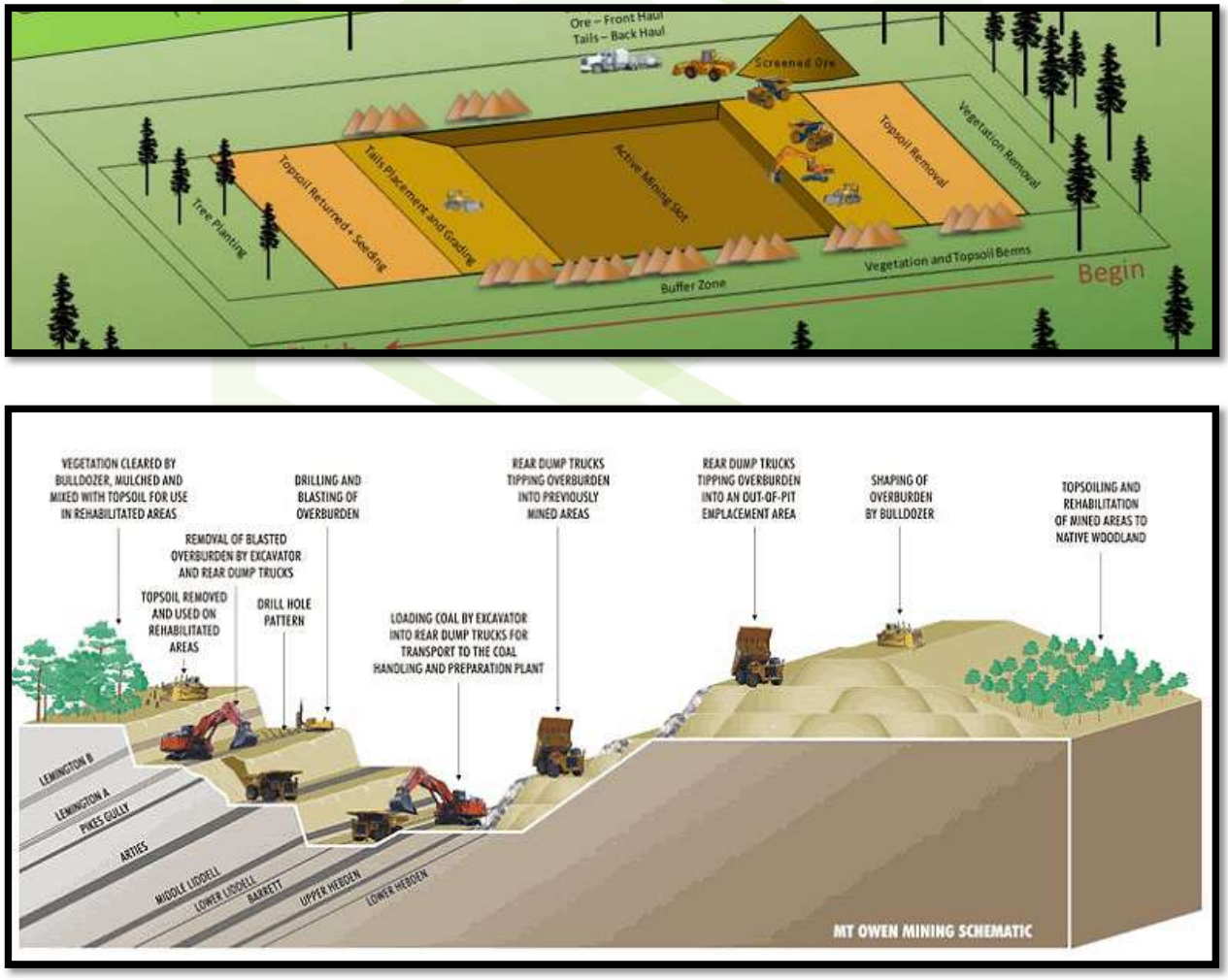


Figure 27: Rehabilitation Illustrations

5. POLICY AND LEGISLATIVE CONTEXT

Table 18 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 18: 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, an 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 Section 102 EMP Amendment has been made to the DMR (01/12/2017) 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 related matters.	**Section 102-** The project requires a EMP Amendment authorisation from the DMR	A section 102 Amendment Application was submitted to the DMR Mpumalanga Application on 01/12/2017
NEMA Environmental Impact Assessment (EIA) Regulations, 2014 (as amended): • GNR 983/GNR327 - Activities13,15,27&30; • GNR 984/GNR325 - Activities 17 • GNR 985 /GNR985- Activities 10,12,14	In terms of the listed activities, a S&EIR process is required. The process is followed in terms of the "one environmental system".	A section 102 Amendment Application was submitted to the DMR Mpumalanga Application on 01/12/2017. 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 resources.	An new 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	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 licence but compliance with relevant norms and standards.	In terms of the list of Section 19 waste management activities, an 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.

National Environment Management Act: Protected Areas Act, 2003 (Act No. 57 of 2003) This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It also seeks to provide for the sustainable utilization of protected areas and to promote participation of local communities in the management of protected areas.	as Protected Areas, the Act details requirements for the management of such areas. This includes various requirements related to management planning and development of a management plan. This includes (i) the need for consultation in preparing a management plan; (ii) the need to take account of integrated development plans of relevant municipalities; (iii) aspects to be included in the management plan. Other aspects such as monitoring and supervision, access control and restrictions relevant to protected areas are also addressed in the Act. For Ramsar/NFEPA sites not yet declared as Protected Areas, the Act provides the vehicle for improving the protection status of such areas in order to further strengthen their protection status.	The Kleinfontein Mine does not fall within an Protected Area.
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 was 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 included in the relevant specialist's Scope of Work.	Mine Closure and Rehabilitation strategy to be informed by CARA

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.
National Freshwater Ecosystems Priority Areas	Refer to the wetland delineation report	
National Dust Control Regulations (GNR827, November 2013) and **Draft National Dust Control Regulations** On 25 May 2018, in Notice 517 in Government Gazette 41650, the Minster of Environmental Affairs gave notice of her intention to repeal and replace the National Dust Control Regulations (published in Notice 827 on 1 November 2013) with new National Dust Control Regulations	Dust fallout monitoring must be conducted and measured against the limits published in GNR827. Monitoring points have been proposed in the EMPr.	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. Pre-cautionary principles to be applied on all levels of mining	Principles included in the Mine Health and Safety Policy.
National Development Plan (2012) The National Development Plan outlines what we should do to eradicate poverty, increase employment and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety.	Used to identify project Need and Desirability and alignment with National Policy.	To form part of the project background and socio-economic evaluation.

New Growth Path (NGP) 2010 The policy's principal target is to create five million jobs over the next 10 years (by 2020). This framework reflects government's commitment to prioritising employment creation in all economic policies. It identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda.	Key objectives and plans to be compared to project proposal.	Used to assess the need and desirability.
Municipal Systems Act, 2000 (Act No. 32 of 2000) Requires municipalities have to undertake an Integrated Development Plan (IDP) process to produce IDPs. An IDP is a legislative requirement and has a legal status and supersedes all other plans that guide development at local government level. In terms of Section 26 (e) of the Act, every municipality is also required to formulate a Spatial Development Framework (SDF) as a part of its IDP.	The project must be tested against the local and district IDP and SDF.	Used to assess the need and desirability.
National Herbarium Pretoria (PRE) Computerised Information System) PRECIS List South Africa uses the internationally endorsed IUCN Red List Categories and Criteria in the Red List of South African plants. This scientific system is designed to measure species' risk of extinction. The purpose of this system is to highlight those species that are most urgently in need of conservation action.	Represent records of all species recorded by members of SANBI, researchers, farmers or the public and submitted to SANBI for identification.	Consulted as part of the ecological study
Hazardous Substances Act, Act No. 15 of 1973	Hazardous substances handling on site will comply with the prescription of the Act and general practices have been included in EMPr.	Management measures included in the 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
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 points and an existing monitoring network is already in place.

The National Water Resources Strategy (DWS, 2013)	The Second Edition of the National Water Resource Strategy (NWRS) describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the policy and law.	Chapter 5 of the NWRS recognized the importance of wetlands and the need for protection of riparian and wetland buffer areas as well as critical groundwater recharge areas.
PROVINCIAL LEVEL		
Mpumalanga Province's Provincial Spatial Economic Development Strategy (PSEDS) 2010. Nationally, the PSEDS is aimed at transforming the structure of the economy and narrowing and eventually eliminating the gap between the first and second economies. The primary objective of the MEGDP is to 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.
Nkangala District Municipality 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 has been considered in 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.	Principles of the IDP have been taken into consideration.

Mpumalanga Biodiversity Sector Plan /Conservation Planning Initiatives MBCP) 2014 AND MSPSP 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. This plan also takes into account the distribution of known aquatic biodiversity sub-catchments in the province.	Used to identify sensitive areas on a spatial scale and serves as a guiding tool for the various specialist studies.	A section of the site falls within a Critical Biodiversity Area
Mpumalanga Conservation Act, Act No. 10 of 1998	Protected species identification included in Specialist SOW	Refer to Ecological Study (Annexure 6)
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.	Refer to the EMP.
Gert Sibande District Municipality: Air Quality Management By-Laws (PG 2300, May 2014)	Measures to prevent and mitigate air pollution have been included in the EMP.	Management measures included in the EMP
Gert Sibande District Municipality: Noise Control By-Law, 2014 **Government Notice No. 2300**	Measures to prevent and manage noise pollution in the District	Management measures included in the EMP
Govan Mbeki Land Use Scheme, 2010 in association with Municipal Structures Act, Act 117 of 1998 and the Municipal Systems Act, Act 32 of 2000.	The MRA is currently zoned as agriculture	Lease agreements are n place with landowners in order to continue agricultural practices.
LOCAL		

Steve Tshwete 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.
Steve Tshwete Local Municipality Integrated Waste Management By-Laws	Steve Tshwete Local Municipality Integrated Waste Management By-Laws.	Steve Tshwete Local Municipality Integrated Waste Management By-Laws.
APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT		
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).	The application is subject to S&EIR process.	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 as agriculture	Lease agreements are n place with landowners in order to continue agricultural practices.
NEMA Regulation on planning and management of residue stockpiles (GNR632, July 2015).	Mine residues defined and handled accordingly.	To be included in the EMP AND IWWMP

The Waste Classification and Management Regulations (GNR634, August 2013).	Mine residue classified accordingly.	Refer to EMP section (PART B) To be included in the EMP AND IWWMP
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 EMP AND IWWMP
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.	Appendix 6 To be included in the EMP AND IWWMP
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 EMP AND IWWMP
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 EMP AND IWWMP

5.1 SPECIALIST INVESTIGATIONS

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

Table 19: List of Specialists

Specialist Study	Appointed Specialist
Aquatic Ecology and Wetland Assessment	M2 Environmental Connections (MENCO)
Surface Water Assessment	M2 Environmental Connections (MENCO)
SASS5 River Health Assessment	M2 Environmental Connections (MENCO)
Civil Engineering and Storm Water Management Plans	Eco Elementum Engineering (Pty) Ltd
Ecological Impact Assessment	Eco Elementum (Pty) Ltd
Geo-hydrological Impact Assessment	Geo Pollution Technologies – Gauteng (Pty) Ltd
Heritage & Archaeological	Mr. Tobias Coetzee
Air Quality Impact Assessment	Eco Elementum (Pty) Ltd
Visual Impact Assessment	Eco Elementum (Pty) Ltd
Noise Impact Assessment	Eco Elementum (Pty) Ltd
Social Impact Assessment	Eco Elementum (Pty) Ltd
Traffic Impact Assessment	Arona Consulting and Engineering (Pty) Ltd
Final Mine Closure, Decommissioning Rehabilitation Plan	Eco Elementum (Pty) Ltd

5.2 LEGAL REQUIREMENTS

The intent to update and existing approved EMP, requires an application and subsequent approvals prior to commencement. Refer to Table 18 for a full list of legal requirements. To this effect, an integrated environmental application process is followed by means of S&EIR. A S&EIR process typically has four phases as illustrated by Figure 28 below. The steps followed to date for this application is outlined in Table 20 below.

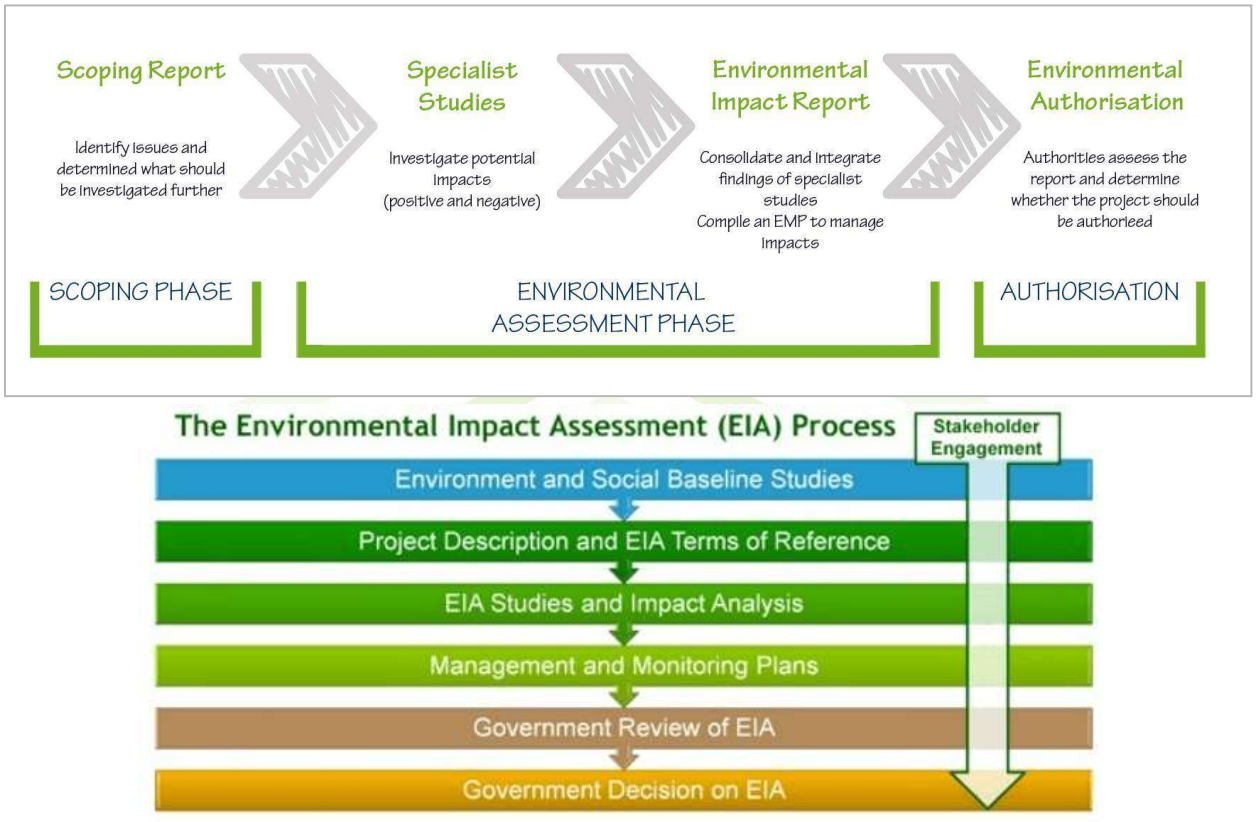


Figure 28: S&EIR flow diagram

Table 20: Steps in the EIA Process

DATE	ACTIVITY	LEGAL TIMEFRAME
01 December 2018	**Application lodged with DMR**	**44 days + 21 Days = 65 Days**
15 December 2017 – 05 January 2018	***December Holidays – excluded from legislated timeframe***	
05 January 2018 – 05 February 2018	Provide I&APs (including relevant State Departments) with the opportunity to review and comment on the Draft Scoping **(30 days PPP)**	
06 February 2018	Final Scoping Report submitted to DMR	**43 days + 21 Days = 64 Days**

15 March 2018	Final Scoping Report accepted by the DMR (not received by Ecoelementum due to faulty fax line)	
06 June 2018	Request for maximum allowable timeframe in order to complete EIA Report and conduct 30 days public participation	**106 days + 50 additional days = 156 (excluding public holidays) = (18 Aug 2018)**
18 June 2018	DMR Approval of maximum allowable timeframe (156 days from acceptance of Scoping)	
11 July 2018 2018-14 August 2018	Provide I&APs (including relevant State Departments) with the opportunity to review and comment on the Draft EIA Report (30 days PPP)	
07 August 2018	Expected Date for Submission of Final EIA Report for decision making	
15 August 2018	Last day for submission (156 days from 15 March 2018)	
30 November 2018 ***(is submitted on 15 August 2018)***	**DMR Decision on Final EIA Report Due**	**DMR Decision Making Process 107 Days**
-	Notify I&APs of decision and Opportunity to Appeal (21 September 2018 – 11 October 2018)	**Appeal Timeframe 20 Days**
-	Closure of Appeal Process	

6. NEED AND DESIRABILITY OF THE PROPOSED PROJECT

- As the operations will be mined via underground methods, the mine will not exclude other land uses from occurring on the remainder of the portions not earmarked for infrastructure.

- The area falls within the Mpumalanga coal fields and as such the economy of the surrounding area is predominantly based on coal mining (and associated services such as coal hauling); agriculture; forestry and timber processing. Coal mining is the third biggest employer in South Africa (Stats S.A).

- 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 15 million ton within the next 10 years.

- 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%.

- 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 District Municipality from 49.1% in 1996 to 69.4% in 2012. The project could this lead to further 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.

- Kleinfontein Mine (Pty) Ltd has an approved Social and Labour Plan (SLP) which outlines the Local Economic Development (LED) programmes set for the surrounding community.

- 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 and Industrial Cluster.

7. ALTERNATIVES ASSESSMENT

Refer to Annexure 4 where the final layout plan is provided in terms of the motivation provided below.

7.1 THE PROPERTY OR LOCATION

The total approved mining area of Kleinfontein Colliery is 2968,851 hectares (ha). Alternative mining sites are not considered feasible for this amendment process as the depth and location of the coal resource/reserves prescribe the layout.

7.2 THE TYPE OF ACTIVITY TO BE UNDERTAKEN

Opencast Mining Operations (existing activity)

7.3 THE DESIGN OR LAYOUT OF THE ACTIVITY

The total approved mining right area of Kleinfontein Colliery is **2968,851** hectares (ha). The total size of the properties on which Kleinfontein Colliery is located is 5 096 ha. During further invasive drilling and exploration activities on the Jicama mining area, new geological information became available which resulted in the mining layout to be altered to ensure optimal mining and utilisation of the available coal resources. This application therefore serves to seek approval for the revised mining layout (Figure 29). The areas in green indicate the revised Jicama mining layout which is applicable to this EMP amendment

The amendment of the current EMP will allow for the following:

- Implementation of new stormwater infrastructure (including. 5 x new Pollution Control Dam, pipes and trenches/berms) to ensure effective water management as per the National Water Act, 1998 (Regulation No. GN 77/GN 704)
- Additional open cast mining on the Kleinfontein Colliery properties – within the existing mining right area (namely seam 2 on the Jicama South Resource Block and 4U seam on Keaton 4 seam resource block situated to the west of the tar road and east of the tar road at Jicama Block 2).
- Alignment of the existing approved EMPs with the newest NEMA EIA Regulations.
    - Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM
    - Jicama MR - MP 30/5/1/2/2/318 MR

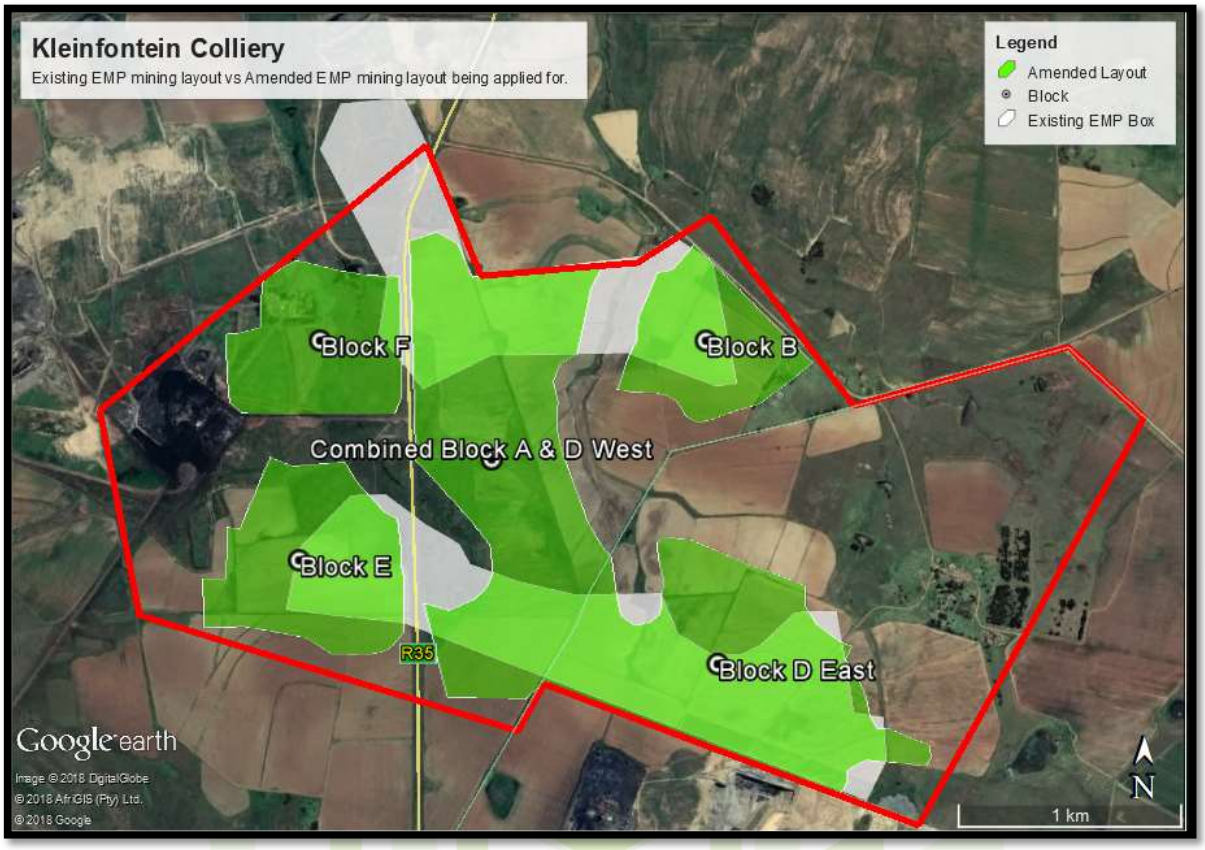


Figure 29: Existing vs Amended Mining Areas

7.4 Operational Aspects of the Activity

At this stage, the operational aspects of the activity are related to opencast mining operation. 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;
- Rehabilitation strategies; and
- 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

7.5.1 Underground vs Opencast Mining Methods

Underground mining methods are not feasible due to the thickness of the coal seams and the shallow depth of the coal resource and therefore opencast concurrent rehabilitation mining methods are preferred.

7.6 The Option Of Not Implementing The Activity

The option of not updating the existing EMPs will translate to ineffective utilisation of approved coal mining rights at Kleinfontein including ineffective stormwater management practices on site. .

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.

a) Identification of Interested and Affected Parties (IAPs);

- Pre-identified I&APs were encouraged to submit their Registration and Response forms to **kleinfonteinpp@ecoelementum.co.za**
- The I&AP database is attached as **Annexure 5.1**

b) Notification of IAPs regarding the proposed project:

- Placing of a newspaper advert (in the Middelburg Observer and Witbank News–**15 December 2017**)- ***Annexure 5.3.1*** and ***Annexure 5.2.2***
- The placing of 4 x site notices at conspicuous places- ***Annexure 5.4***
- The sending of notices to affected parties via registered post, email and hand delivery of notices (where applicable) – ***Annexure 5.5.1 - 5.1.12***

h) Providing IAPs with a 30- day opportunity to review and comment on all the Draft Scoping Report between **05 January 2018 – 05 February 2018** by the following means

- Copies left at the Middelburg Library
- All reports were made available electronically on the Eco Elementum website (http://ecoelementum.co.za/downloads)
- Soft Copy (CD) format on request.
- Soft Copy reports were sent the following State Departments for comment
  - Department of Water and Sanitation
  - Steve Tshwete Local Municipality,
  - Nkangala District Municipality,
  - Gert Sibande District Municipality
  - Mpumalanga – Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA)
  - Mpumalanga Tourism and Park's Agency (MTPA)
  - Mpumalanga Department of Co-operative Governance and Traditional Affairs (Land Use Management)

e) Gathering comments, issues and concerns from IAPs (Issues and Response Report) – See ***Annexure 5.9***
f) Responding to IAP comments, issues and concerns (Issues and Response Report) ***Annexure 5.9;*** and
g) Compilation and submission of results of consultation report to the DMR;

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

8.2 SUMMARY OF PUBLIC PARTICIPATION

Table 21: Comments and Response Report

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				
JD Skosana/Sunil Mungaroo UMCEBO PROPERTIES: • REMAINING EXTENT OF PORTION 1 OF THE FARM MIDDELKRAAL 50 IS, • REMAINING EXTENT OF PORTION 4 OF THE FARM MIDDELKRAAL 50 IS • PORTION 14 (A PORTION OF PORTION 3) OF THE FARM LEEUWFONTEIN NO. 48 IS • REMAINING EXTENT OF PORTION 4 OF THE FARM LEEUWFONTEIN NO. 48 IS • REMAINING EXTENT OF PORTION 5 OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 15 (A PORTION OF PORTION 3) OF THE FARM LEEUWFONTEIN NO. 48 IS	08/01/2018 Email Registered Post			

• PORTION 16 (A PORTION OF PORTION 3) OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 2 OF THE FARM KLEINFONTEIN 49 IS					
OOSTHUIZEN, FREDERIK JOHANNES (CEO) Pieter Boshoff (Contact Person) Kleinfontein Colliery (Pty) Ltd • PORTION 17 OF THE FARM LEEUWFONTEIN NO. 48 IS • PORTION 8 OF THE FARM KLEINFONTEIN 49 IS	Applicant/Client				
July Ndluvo (CEO) Anglo Coal Operations • PORTION 8 OF FARM KLEINFONTEIN NO. 49 IS	08/01/2018 Email Registered Post				
Sharon Clark (Principle Land and Biodiversity) BHP Billiton Coal South Africa (now SOUTH 32) REMAINDER OF THE FARM KLEINLEEUWFONTEIN 563 IS	08/01/2018 Email Registered Post				
LAWFUL OCCUPIER/S OF THE LAND					
OOSTHUIZEN, FREDERIK JOHANNES (CEO) Pieter Boshoff (Contact Person) Kleinfontein Colliery (Pty) Ltd • PORTION 17 OF THE FARM LEEUWFONTEIN NO. 48 IS	Applicant/Client				

• PORTION 8 OF THE FARM KLEINFONTEIN 49 IS					
LANDOWNERS OR LAWFUL OCCUPIERS ON ADJACENT PROPERTIES X					
JD Skosana/Sunil Mungaroo UMCEBO PROPERTIES PORTION 4 OF THE FARM MIDDELKRAAL	08/01/2018 Email Registered Post				
MUNICIPAL COUNCILLOR X					
MUNICIPALITY (DISTRICT) X					
SK Mashilo Mayor (Nkangala District Municipality Pierre Rossouw Environmental Health Officer Nkangala District Municipality Charles Makula Nkangala District Municipality Municipal Manager	08/01/2018 Email 08/01/2018 Email Email + Hard Copy Report 08/01/2018				
MUNICIPALITY (LOCAL) X					
Ms D Lambrechts Steve Tshwete Local Municipality- Directorate Infrastructure Services - Physical and Environmental Development	Courier Hard Copy Report 08/01/2018				
Municipal Manager Gert Sibande District Municipality	Email+ Courier Copy Report 08/01/2018	11/04/2018 Comment received via email	Mr CA Habili (Municipal Manager) [sic] The above-mentioned report was received by the official on 26 October	Thank you for the comment received from your Department. All the duty of care principles listed in your comment forms part of the EIA Report and	

Steve Tshwete Local Municipality- Directorate Infrastructure Services - Physical and Environmental Development			2017. The comments to follow are in relation to the following legislations and policy directives: • National Environmental Management Act (Act 107 of 1998) • National Environmental Management: Biodiversity Act (Act 10 of 2004) • Air Quality Management (Act 39 of 2004) • Waste Management Act (Act 59 of 2008) • Gert Sibande District Municipality By-laws (no. 2300 of 2014) • National Health Act (Act 61 of 2003) • National Water Act (Act 36 of 1998) as amended The following are comments from Gert Sibande District Municipality for consideration of the application: • The applicant must ensure that the requirements of the National Environmental Management Act (Act 107 of 1998), its Specific Environmental Management Acts and the Gert Sibande District Municipality By-Laws (No. 2300 of 2014) are adhered to. • No activities must be undertaken at any biodiversity and conservation sensitive areas within the proposed sites in terms of the District and Govan	Environmental Management Plan. The biodiversity specialist will assess the site in terms of the Mpumalanga C-Plan. Additional infrastructure (including 5 PCDs and associated infrastructure) will be located outside the 32m and 100m buffer zones of the wetlands located on site. Should any Section 21 water uses become necessary, the applicant will apply for the uses from the Department of Water and Sanitation.	

			Mbeki Local Municipality Environmental Management Framework/plan. • Duty of care principle as per the National Environmental Management Act, 107 of 1998 as amended, must be taken into account throughout the proposed project during all operations and close up. • In reference to Page 53 of the Draft Scoping Report (Kleinfontein Colliery Section 103 EMP Amendment – Draft Scoping Report) which indicated that a team of specialists and Engineers have been appointed to undertake the specialist studies which will investigate the baseline environmental, potential impacts and provide management measures where applicable. Reference must also be made of the Mpumalanga Biodiversity sector plan as well as the draft Gert Sibande bioregional plan. The district will not support any deviation / interference / obstruction of the wetlands. • In reference to Figure 25 of the Draft Scoping Report (Kleinfontein Colliery Section 103 EMP Amendment – Draft Scoping Report) which indicates that within the Kleinfontein Colliery boundary there are existing tributaries and rivers.		

			The applicant must ensure that no new developments or operations are done within 100m of these tributaries and rivers. • The applicant must put in place preventative and control measures for incidents as part of the EMPr in order to control and limit the negative impact of industrial activities and products on human, plants, animals and the environment, rehabilitation plans and procedures must be in place for any incidents response and immediate rehabilitation. • The processes must avoid all sources of dust or particulate matter generation ad immediate mitigation plans be implemented in consultation with the District Air Quality Officer including all unpaved roads. • There should be strict adherence to national road traffic Act prescriptions including District Noise By-Laws. • Water used for human consumption must comply with South African National Standards (241 – 1:2015) for drinking water and regular sampling be done on the SANAS accredited laboratory. • Should water be abstracted, permission should be received from the Department of Water and Sanitation (DWS).		

			• All waste generated on site must be stored, handled and disposed of accordingly, i.e. general waste should be disposed of in a licensed municipal landfill site, hazardous waste should be treated before disposal or disposed of at a licensed hazardous waste landfill site and mine discards should be discarded in a licensed landfill site.
			• Any complaints received from the public during the proposed activity phases must be documented and reported to the district and attended to within three working days after such reporting to the satisfaction of all parties engaged.
			  • All incidents or complaints should be reported to Department of Agriculture, Rural Development, Land and Environmental Affairs, Gert Sibande District Municipality and Govan Mbeki Local Municipality.
			  • The EMPr must include detailed but not be limited to the following:
			  ○ Environmental Pollution Prevention Plan
			  ○ Specialist Study Report impacts and mitigation measures		

			○ Site specific Rehabilitation Plan ○ Incident Emergency Plan ○ Site Environmental Management Operational Plan • The applicant should ensure that all supervisors and management on site is fully conversant with the content and requirements of the EMPr as part of the coping Report, including made available to the project manager and any other person(s) or organisation(s) working on the site. • The applicant must ensure that a qualified environmental person should be present at all times during operations on site in order to make contractors comply with the EMPr and any specific specialist recommendations to be made. • Monthly reports on the implementation of the EMPr must be sent to the relevant authorities.Should you have any queries, please contact Ms LF Magagula on 017 801 7177.		
MDEDE					
Mohau Ramodibe	Email				

Mr J Mtsweni (Director)	08/01/2018				
Ms. S.P. Xulu(HOD	Courier Hard Copy Report Email 08/01/2018				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)					
Musa Lubambo DWS	Email 08/01/2018				
Ben Viljoen Department of Roads and Transport	Email 08/01/2018				
Noxolo Galela ESKOM	Email 08/01/2018				
Thami Hadebe Transnet Servitude Management	Email 08/01/2018				
Klaus Schimdt SANRAL	Email 08/01/2018				
Thabile Mkhabela Mpumalanga Commission on Restitution of Land Rights	Email 08/01/2018				
Themba Richard Milanzi (Department of Labour Assistant Manager)	Email 08/01/2018				
David Nkambule Mpumalanga Roads & Transport	Email 08/01/2018				
Musa Mondlane Director of Environmental Management - Mpumalanga Department of Agriculture and Land Affairs	Email 08/01/2018				
Andre Hoffman (Mpumalanga Tourism and Parks)	Email 08/01/2018				
Communities					
John Mokoena Obo Bathlaoane Ba Manzimnyanma		28/12/2017	6) Land claim has been submitted for Kleinfontein 49IS,	6) The land claim has been noted	Refer to Section D for more information

(Land Claim on Kleinfontein 49 IS, Leeufontein 48 IS and other adjacent farms)	08/12/2018: Emailed DSR notification and collection of CD from Ecoelementum's offices	Received registration letter via email 17/01/2018 Comment received	Leeuwfontein 48 IS and other adjacent farms 7) Need information on the mining method 8) Rehabilitation Plan information 9) Information on the Social and Labour Plan and the mining charter. How does it benefit the local community? 10) What other economic benefit will flow from the current landowners to the successor in title such is royalties or lease income etc	7) The mining method will be opencast. 8) This plan will be made available during the Draft EIA phase of the project 9) The SLP and Mining Charter will be made available during the Draft EIA phase of the project 10) Besides local employment and local economic development, the mining company will have to be consulted directly to discuss the pending land claim as the Title Deeds are currently in the name of the legal property owners.	
NL Bosman Agri Mpumalanga	Email 08/01/2018				
Thabo Madihlaba Environmental Justice Networking Forum Director	Email 08/01/2018				
Zweli Dlalisa Eastern Wetland Rehabilitation - Managing Director	Email 08/01/2018				
Erica Joubert Grassland Society of South Africa (GSSA)	Email 08/01/2018				
Chamber of Mines	Email 08/01/2018				
Dept. Land Affairs					
	XEmail 08/01/2018		No comment	N/A	N/A
Traditional Leaders					
	X N/A				
Dept. Environmental Affairs					
	Email				

	08/01/2018				
Registered I&AP X					
Johan		05/02/2018	Concerned over graves associated with the historic Valsfontein community/place which dates between 1930-1935	Mr Johan has been registered. Still awaiting his official contact details.	

9. THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES

9.1 Description Of The Current Land Uses

The vast majority of the surrounding land is used for agricultural purposes, most notably the farming of maize but also include grazing lands for livestock **(Photo 1).** A significant portion of the site is still used to agriculture purposes and are managed according to lease agreements.

On a larger scale, other activities such as mining (Middelkraal Colliery and Ilanga Mining) and the construction of dams are also evident. (**Error! Reference source not found.**). Mining activities have taken place since the 1980's in this area by Umcebo Mining (Pty) Ltd which is owned by Shanduka Coal. From an ecological perspective, it is important to note that the Olifants River flows to the south, west and north of the mining site, as well as flowing through the assessment site at some stages. While most of the farmland is currently being used as growing fields, a few fields have been abandoned, resulting in them being invaded by exotic species. Two rocky outcrop areas are also found within the mining right boundary.

Photo 1: Livestock grazing

Photo 2: Area surrounding block E

Photo 3: Dense vegetation at Block F

Photo 4: Mining Activities to the North

The topography in the district can be described as gently undulating with slopes with inclinations varying between 3° and 10°. It is characteristic of the post-African erosion surface back-working into the African surface, which remains preserved in places on the higher lying interfluves. The colliery itself is characterised by gentle slopes mostly towards the east with the Olifants River valley bottom situated to the west. The elevation ranges between 1550-1670.2 masmsl.

The Olifants River (flowing west of the site in a south-north direction) and the Northern Leeuwfontein Spruit (flowing east-west direction) is situated the north of the property where it eventually confluences with the Olifants River towards the northwest. The south-flowing Eastern Leeuwfontein Spruit runs through the eastern boundary of the mine and joins the Olifants River on the south-eastern boundary of the mine. Various non-perennial streams occur on site including wetlands and natural spring areas. The land capability classes range from arable, wetland and grazing. The majority of the area in and around the mine is used for farming and grazing.

The preferential path of drainage of the site follows the topography in a north westerly direction

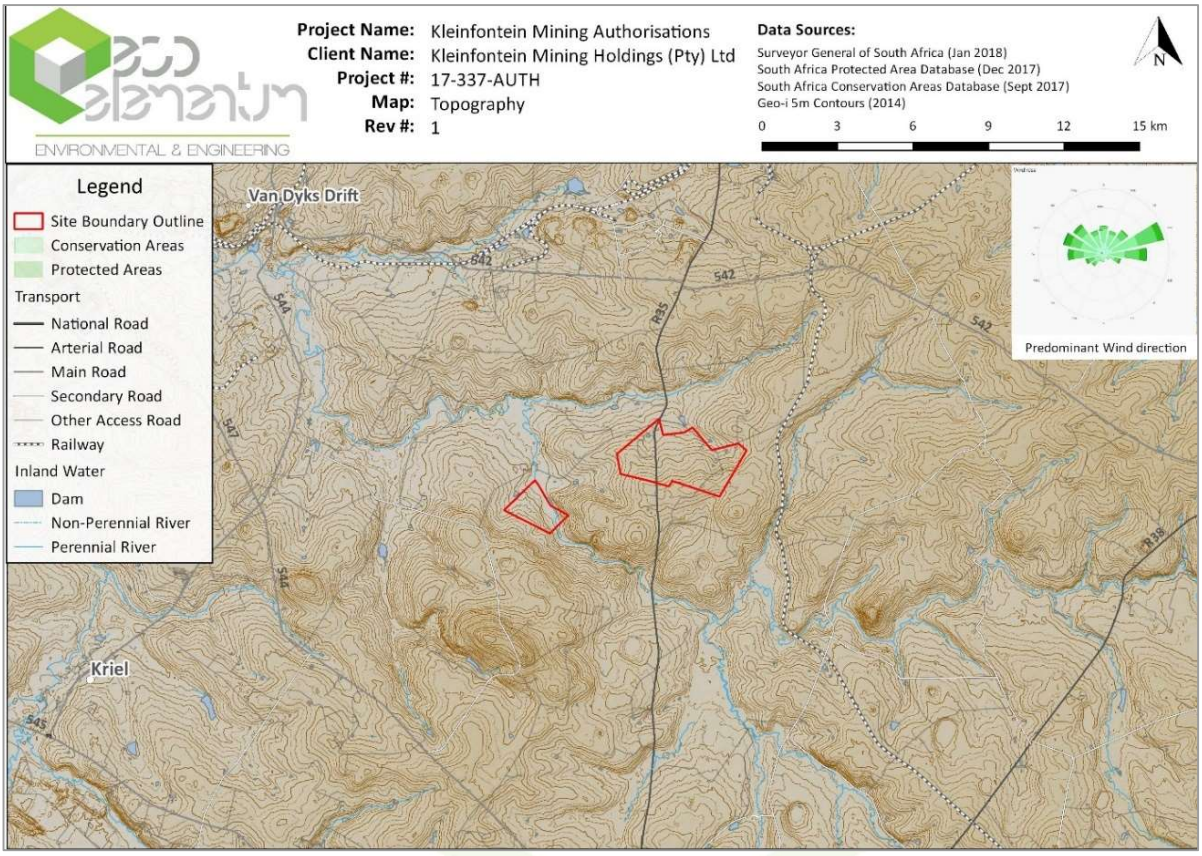


Figure 35: Site Elevation and Infrastructure

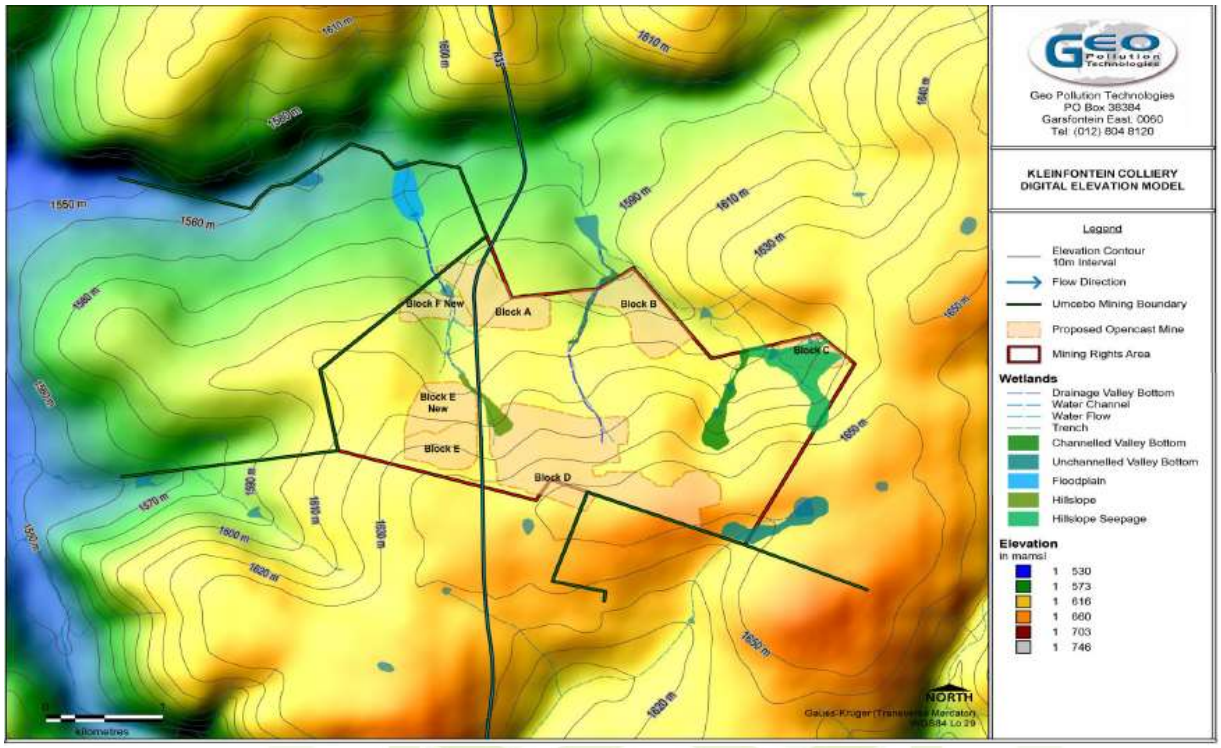


Figure 36: Digital Elevation Model

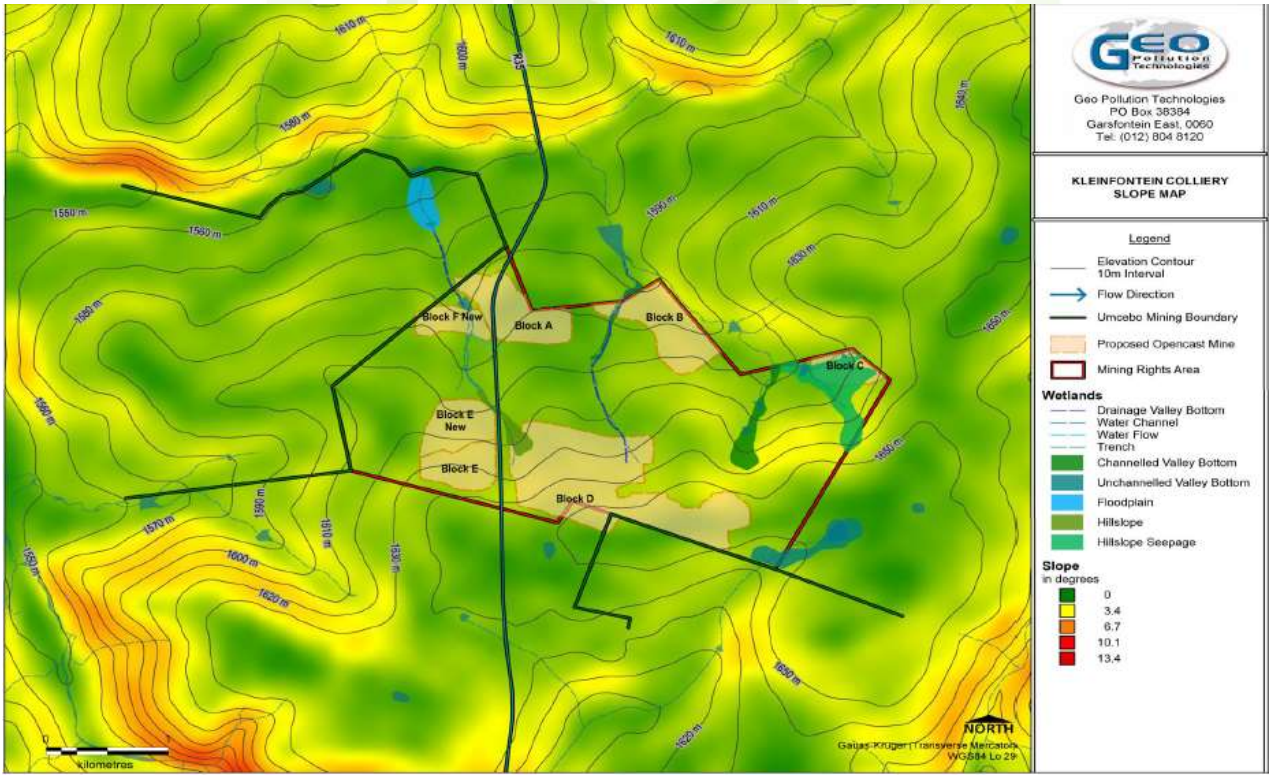


Figure 37: Slope Aspect Map

9.1.1 Geology

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. Coal bearing strata of the Witbank Coalfield as contained within the Vryheid Formation of the Ecca Group. The Vryheid formation varies from 60m to 200m in thickness in the area and consists of alternating sandstones and shales. Is estimated that the coal reserve in the area is 16.3million tons

The geology within the mining boundaries can be described as follows:

- The majority of the surface area is covered by Vryheid formation shales and sandstones containing the mineable coal seams
- On both the eastern and western sides Vaalian diabase ins present'
- A dolerite sill present to the north, which displaced some of the sedimentary layers

The predominant and economic seams present in the area include the No. 1, 2 and 4 seams. The No. 3 and 5 seams are in general absent in the area of interest. Eskom with the target of providing premium Eskom spec of 22.5MJ/kg CV (Calorific Value)

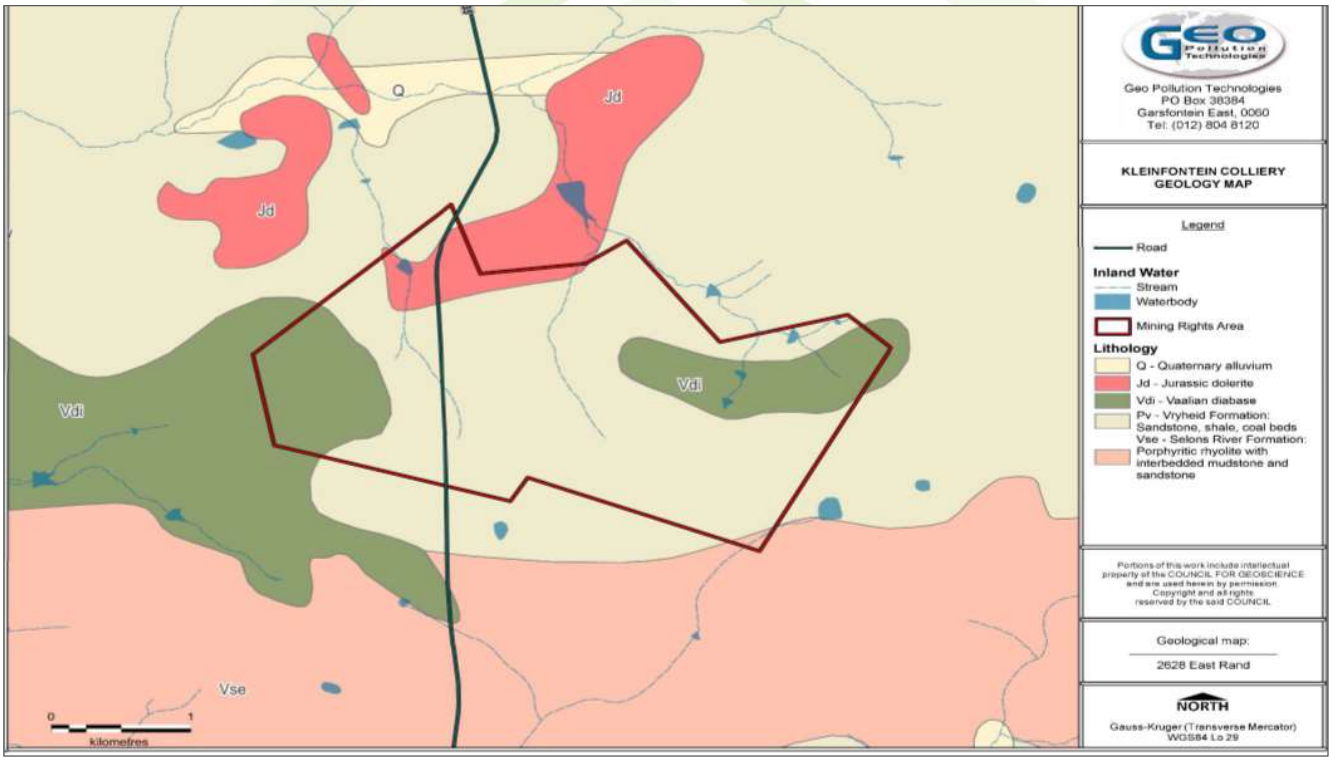


Figure 38: Geological Map

9.1.2 Drilling Results of 2017

During further invasive drilling and exploration activities on the Jicama mining area new geological information became available which resulted in the mining layouts to be altered to ensure optimal mining and utilisation of the available coal resources

9.1.2.1 #4U Seam

The No.4U seam is well developed over the resource area. It has an average mineable thickness of 1.8 metres. The coal qualities are poor due to interbedded shale and sandstone bands and the coal should be de-stoned for possibly the Eskom market. The roof consists mainly out of a thick, medium grained, white sandstone layer which would form a fairly competent roof in the case of an underground mine.

9.1.2.2 #4L Seam

This seam lies underneath the No.4U seam and in most cases, a thin mudstone/shale parting (±1m) separates these two seams from each other. This seam forms about 40% of the total resource tonnages in the area. Mudstone in-seam partings are sometimes present in the upper part of the No.4L seam. These layers have a raw ash content of well over 40% and were excluded in the selection of mineable seam thickness. Roof conditions generally are poor because of the overlying mudstone and shale bands between the 4U and 4L seams.

9.1.2.3 #2 Seam

The No.2 seam lies about 15-20 metres below the No.4L seam. It contributes roughly about 60% towards the total resource tonnages. Dolerite intrusions and the effects thereof also played a major role when defining the seam boundaries. The strata between the 4L and 2seams consist mainly out of sandstone and shale layers with the shale predominantly towards the base. Total thickness of up to 9 meters were intersected by boreholes but that includes layers of shale and shaly sandstone. These layers, which occur mainly towards the top of the seam, were excluded where it exceeds an Ash content of 40%. These layers will form the roof in the case of an underground mine operation. The selected horizon has an average thickness of 3.45 m and the coal qualities vary from medium to high in places. The seam has a good export potential as well as a medium to high places. This seam has good export potential as well as a middling's product for power generation on the local markets.

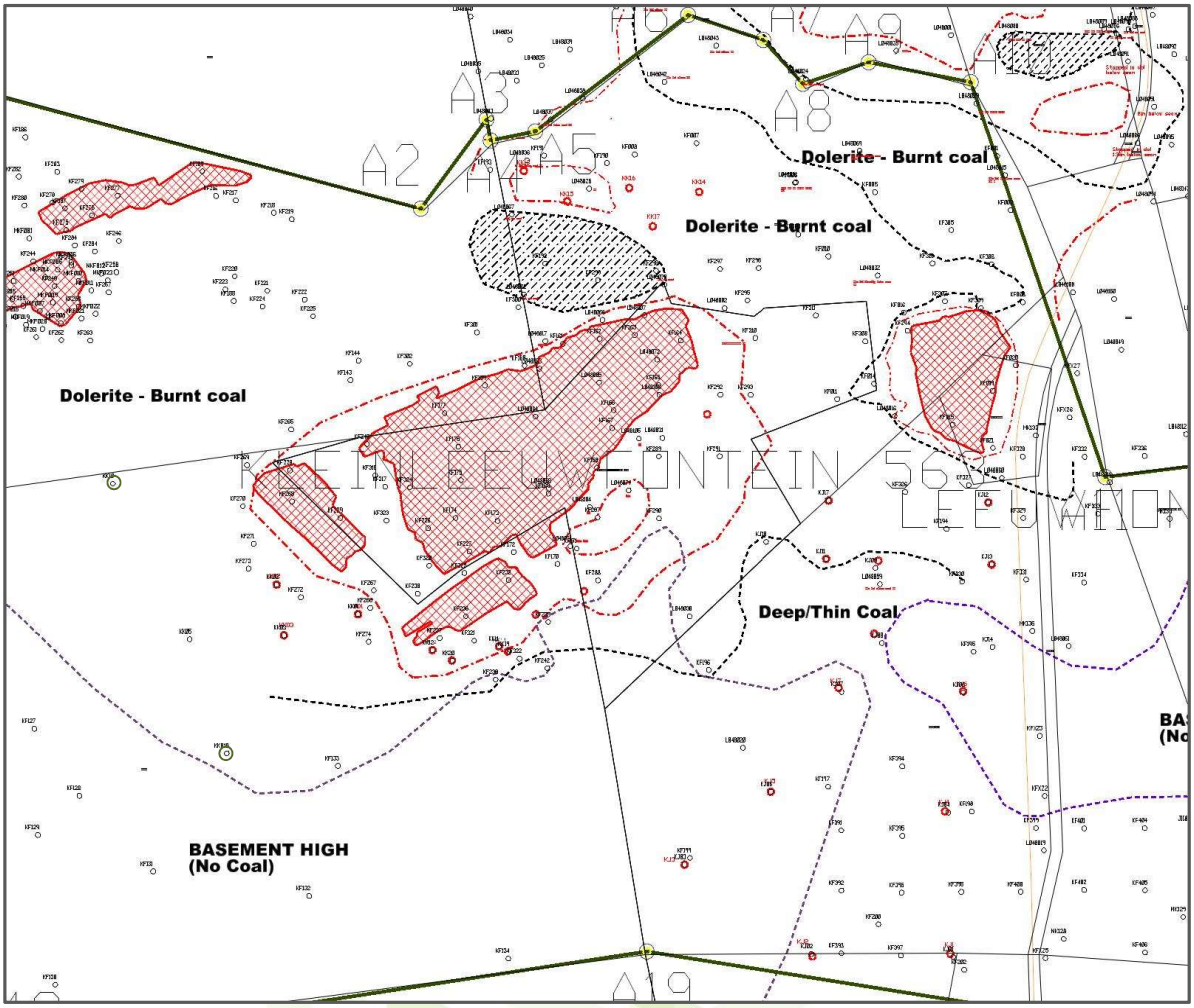


Figure 39: Drilling Sites 2017

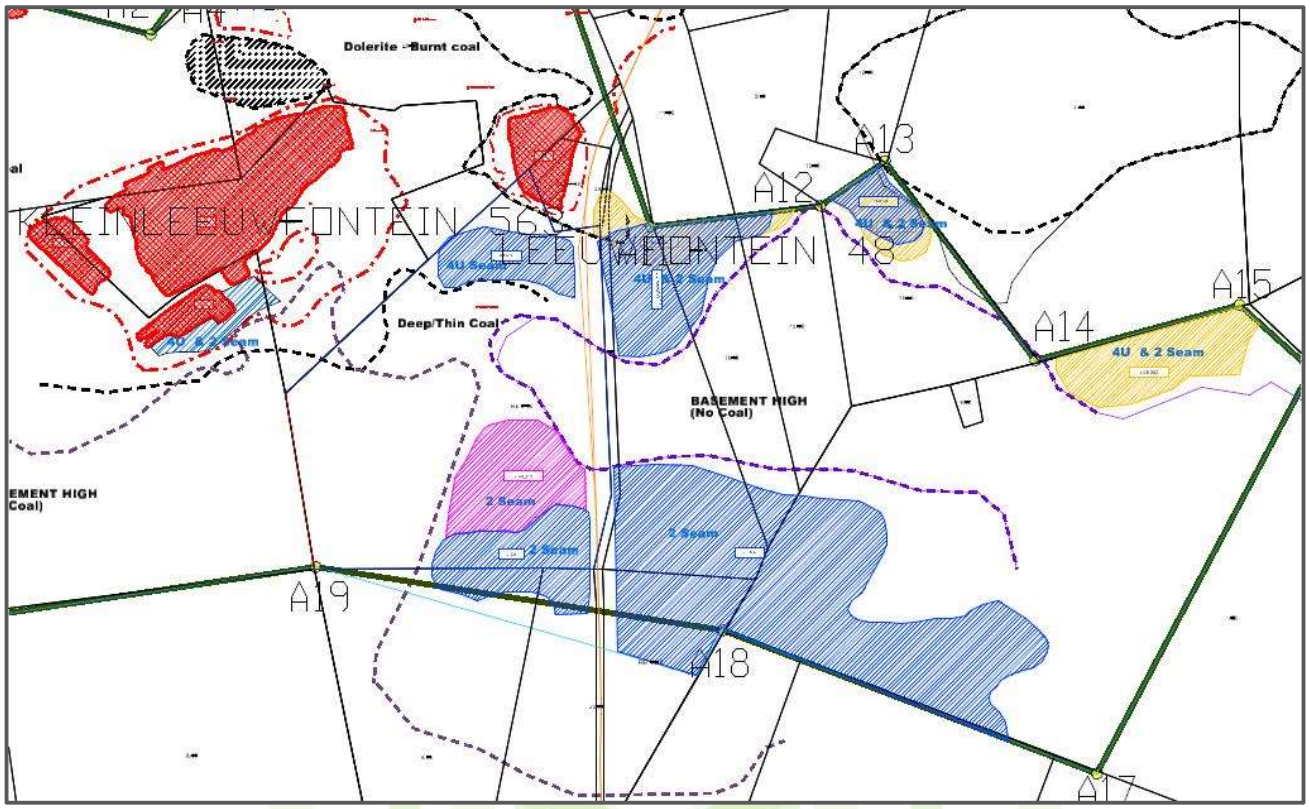


Figure 40: Potential Resource Blocks Identified in 2017

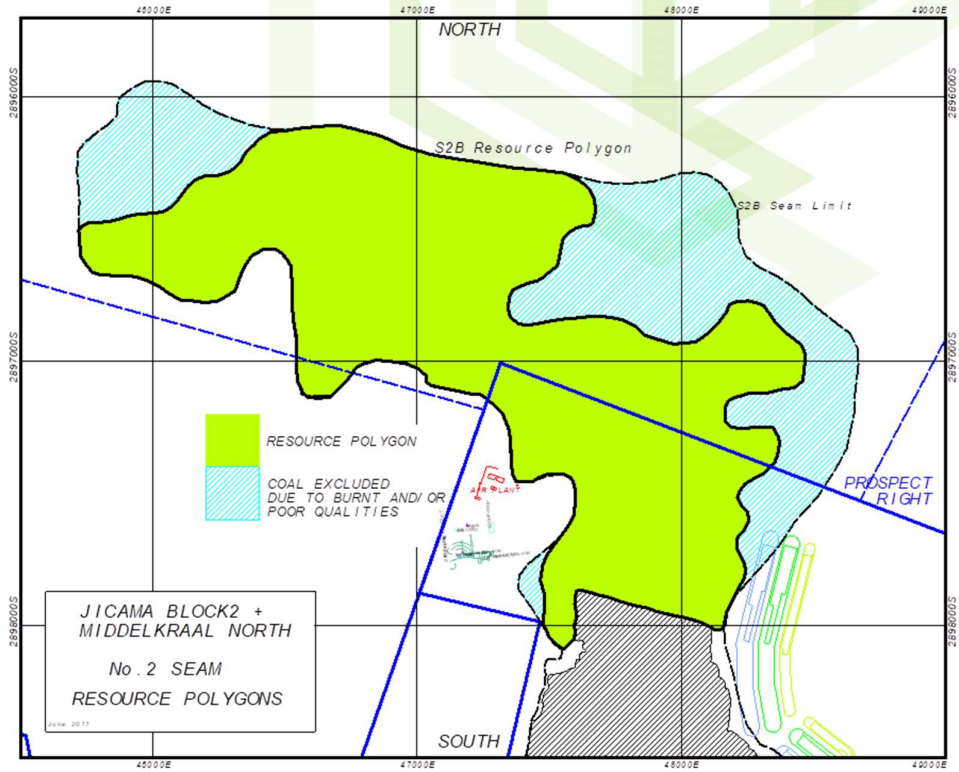


Figure 41: Jicama Block 2 (Middelkraal) Resource Map

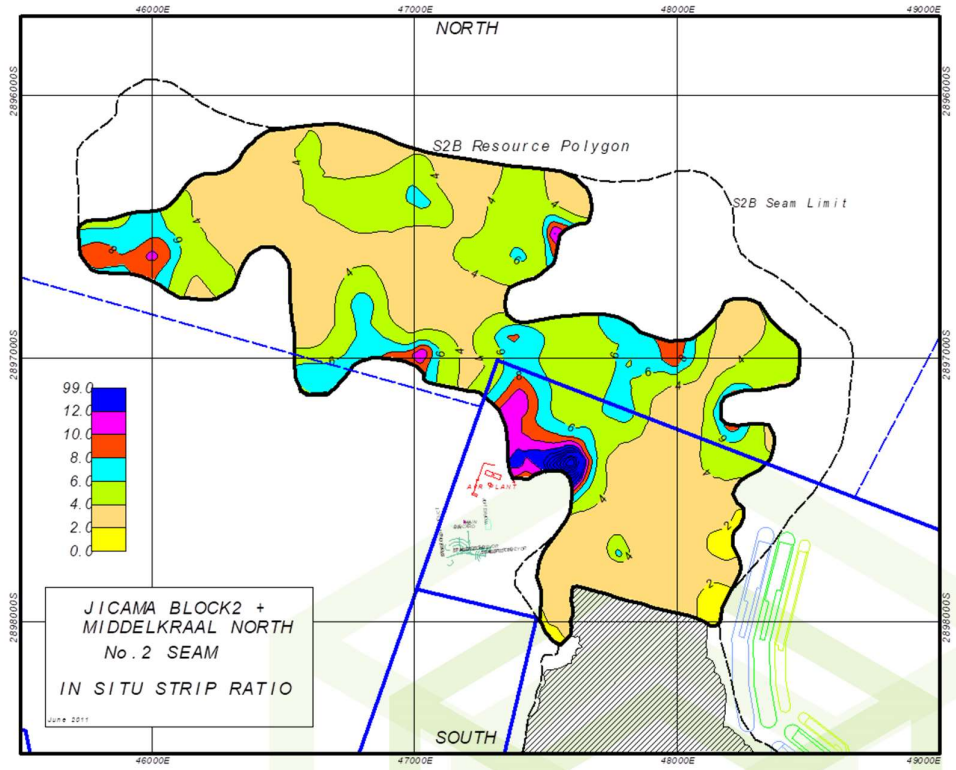


Figure 42: Jicama Block 2 (Middelkraal) Strip Ratio

9.2 Type Of Environment Affected By The Proposed Activity

9.2.1 Climate and Air Quality

South Africa is located in the sub-tropics where high pressures and subsidence dominate. However, the southern part of the continent can serve as a source of hot air that intrudes sub-tropics, and that sometimes lead to convective movement of air masses. On average, a low pressure will develop over the southern part of the continent, while the normal high pressures will remain over the surrounding oceans. These high pressures are known as Indian High Pressure Cells and Atlantic High pressure Cells. The intrusion of continents will allow for the development of circulation patterns that draw moisture (rain) from either tropics (hot air masses over equator) or from the mid-latitude and temperate latitudes. Southern Africa is influenced by two major high pressure cells, in addition to various circulation systems prevailing in the adjacent tropical and temperate latitudes. 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 project area and between neighbouring provinces and countries bordering South Africa. The Department of Environmental Affairs (DEA) operates a monitoring network over the Highveld region at the residential areas of Hendrina, Ermelo, Middleburg, Secunda and eMalahleni.

9.2.1.1 Wind

Based on an evaluation of the meteorological data simulations run from a global NEMS weather model at ~30 km 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 **Error! Reference source not found.** below, at the site, calm conditions with wind speeds of 12 km/h or less, are predicted 2-7 days per month throughout the year. 12-19 km/h winds are predicted 11-16 days per month through the year. Wind speeds of more than 19 km/h are predicted to occur 9-17 days per

year on average. From Figure 31 the predominant wind direction is predicted to occur mainly from the east-north-east direction more than 1100 hours per year with wind speeds higher than 5 km/h. Secondary winds of more than 5 km/h can be expected from the east and the west to north-west 830 and 1900 hours per year respectively

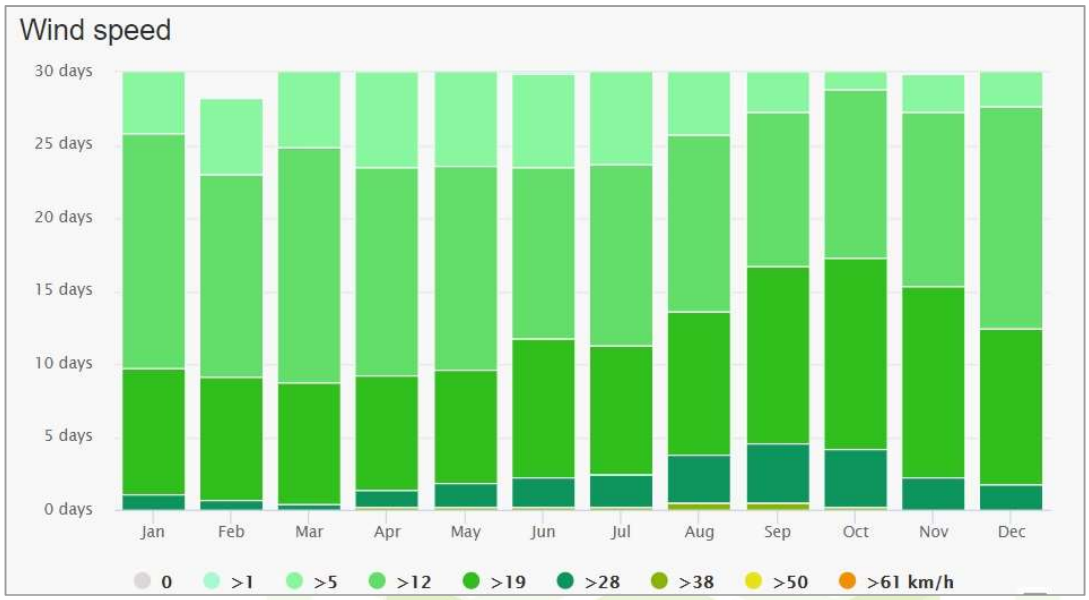


Figure 30: Wind Class Frequency

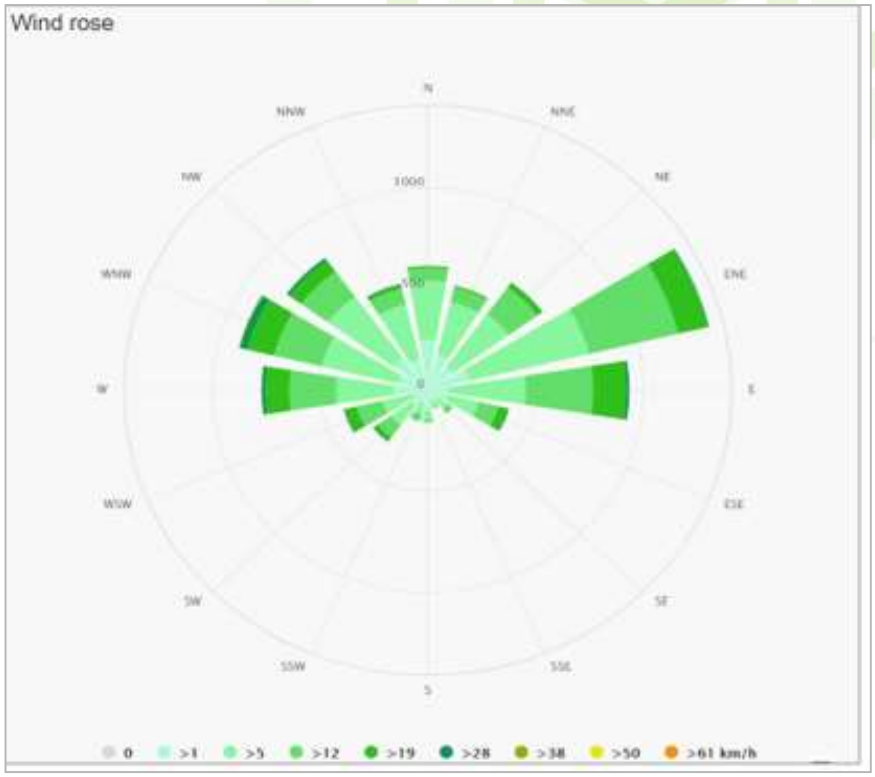


Figure 31: Wind Rose for the period 1985 to current

9.2.1.2 Temperature:

Temperature affects the formation, action, and interactions of pollutants in various ways (Kupchella and Hyland, 1993). Chemical reaction rates tend to increase with temperature and the warmer the air, the more water it can hold and hence the higher the humidity. When relative humidity exceeds 70%, light scattering by suspended particles begins to increase, as a function of increased water uptake by the particles (CEPA/FPAC Working Group, 1999). This results in decreased visibility due to the resultant haze. Many pollutants may dissolve in water to form acids. Temperature also provides an indication of the rate of development and dissipation of the mixing layer.

Based on an evaluation of the meteorological data simulations run from the global NEMS weather model at ~30 km resolution from 1985 to current of the project area. The following deductions can be made; In the summer months' maximum average daily temperatures are predicted to be 25°C to 27°C on average with a maximum of 32°C possible during hot days, dropping to a predicted 11°C to 13°C on average at night and 6°C minimum on cold nights. During winter months the average day time temperature are predicted in the 18°C to 25°C range while cold winter night time temperatures predicted to drop to -3°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. October to January are predicted the highest rainfall months with between 76 mm to 107 mm predicted per month during these months. February and March is predicted to receive 55 mm precipitation. All other months are predicted to receive less than 26 mm precipitation on average during the month.

9.2.1.3 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 Tala Bethal Coal project area is shown in **Figure 32** 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.

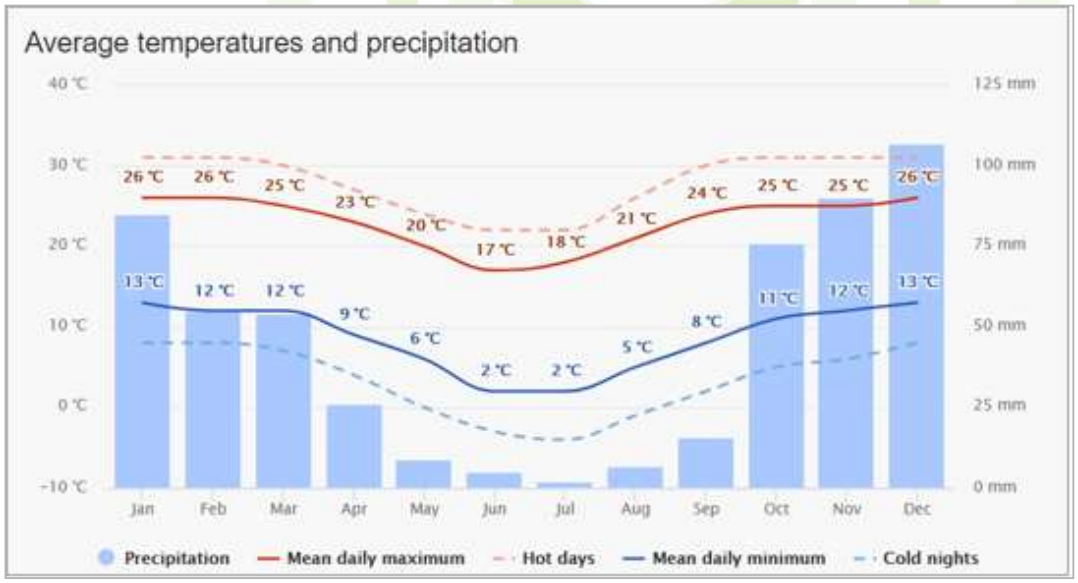


Figure 32: Temp and precipitation simulation results from the NEMS model for the Kleinfontein project area (1985 - current).

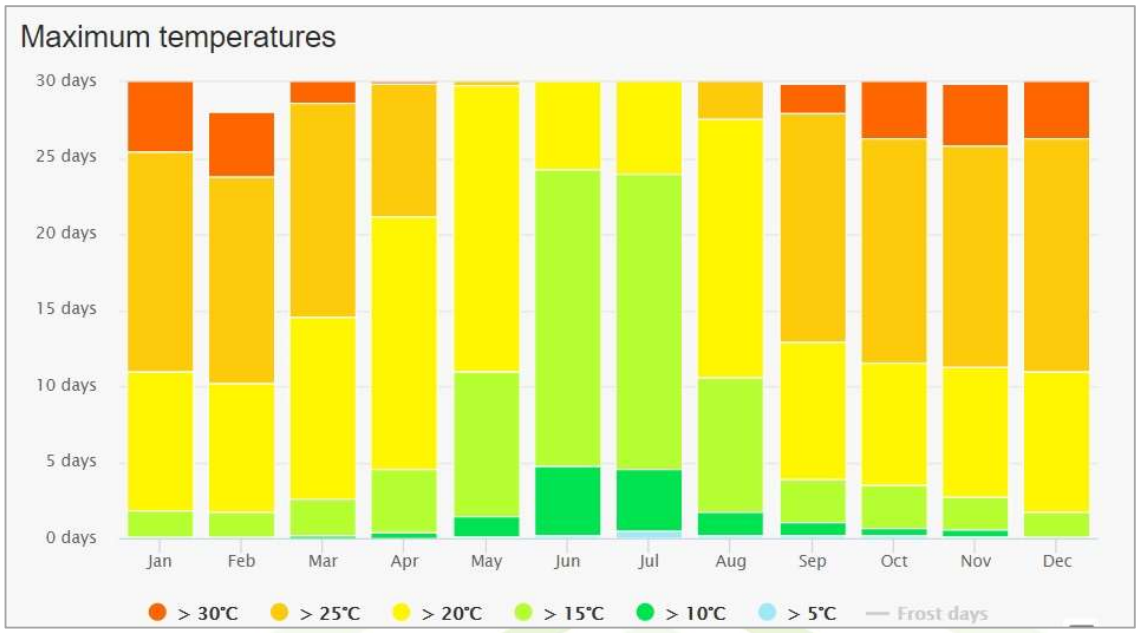


Figure 33: Maximum temperatures as simulated from the NEMS 30 km model for the Kleinfontein project area (1985 – current)

9.2.1.4 Sensitive Receptors

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)

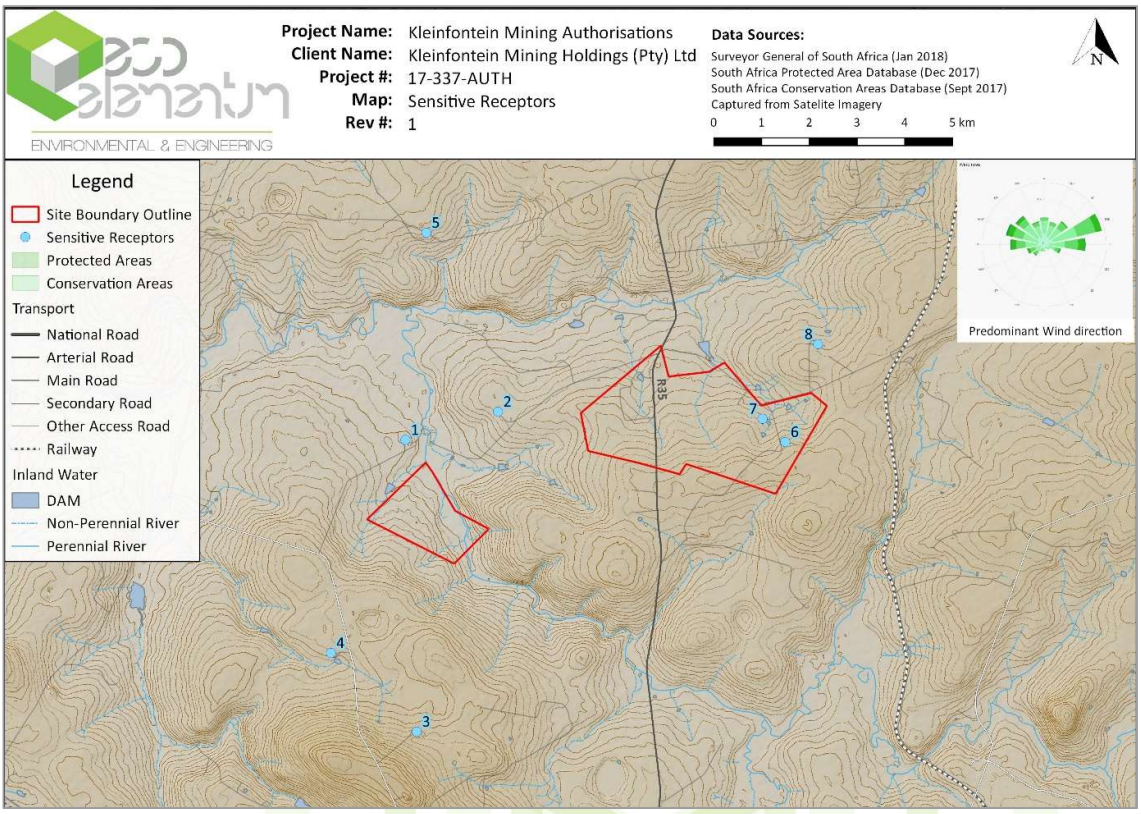


Figure 34: Air Quality - Sensitive Receptors

9.2.1.5 Air Quality Impact Sources

Pollutants of concern include:

- 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)

Key sources of air pollution surrounding the site are related to the following existing activities:

- Agricultural activity;
- Mining activity;
    - 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.;
    - 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 access roads, pipes, storm water diversion berms, drilling, blasting and opening of boxcut (Blasting will increase the generation of coal blown dust
    - Use and maintenance of access roads
    - Dust from material handling.
- Vehicle dust entrainment on unpaved roads;
- Wind erosion from exposed areas (e.g. opencast pits, stockpiles, open storage piles, cultivated land, etc.); and

9.2.1.6 Vehicle Exhaust Gases

Vehicle exhausts contain a number of pollutants including carbon dioxide (CO2), carbon monoxide (CO), hydrocarbons, oxides of nitrogen (NOx), sulphur and PM10. Tiny amounts of poisonous trace elements such as lead, cadmium and nickel are also present. The quantity of each pollutant emitted depends upon the type and quantity of fuel used, engine size, speed of the vehicle and abatement equipment fitted. Once emitted, the pollutants are diluted and dispersed in the ambient air. Pollutant concentrations in the air can be measured or modelled and then compared with ambient air quality criteria

9.2.1.7 Veldfires

Veld fires are widespread across the world, occurring in autumn, winter and early spring. In addition to controlled fires for fire-breaks and veld management, many fires are set deliberately for mischievous reasons. Some, accidental, notably those started by motorists throwing cigarettes out of car windows. Emissions from veld fires are similar to those generated by coal and wood combustion. Whilst veld fire smoke primarily affects visibility and landscape aesthetic quality, it also contributes to degradation of the regional scale air quality. Dry combustible material is consumed first when a fire starts, while surrounding live, green material is dried by the large amount of heat released from veld fires, sometimes this material also burn. The major pollutants from veld fires are particulate matter, carbon monoxide, and volatile organics. Nitrogen oxides are emitted at rates from 1 to 4 g/kg burned, depending on combustion temperatures. Emissions of sulphur oxides are negligible (USEPA, 1996).

9.2.1.8 Trucks Passing On the Gravel Road, Loading And Offloading Raw Materials

Dust emissions occur when soil is crushed by a vehicle, as a result of the soil moisture level being low. Vehicles used on the roads will generate PM-10 emissions throughout the area and they carry soils onto the paved roads which would increase entrainment PM-10 emissions. The quantity of dust emissions from unpaved roads varies linearly with the volume of traffic.

9.2.1.9 Wind Erosion As A Result Of ROM Material and Topsoil Stockpiles

The topsoil and waste rock stockpiles generated during the construction phase will be minimal and probably used for construction purposes on site (berm and foundations for buildings), reason being that this will be limited to the mining areas – since the project is mainly an opencast operation. At the ROM stockpile, there will be constant transfer of ore from the opencast to the stockpile and then to the crushing/screening.

9.2.1.10 Material Handling (Loading, Hauling and Tipping)

Material handling during loading, hauling and tipping as mining processes has been known to have influence on dust generation in terms of increasing the fugitive dust emissions being generated. With the different kind of materials – topsoil, soft, and hard, tipping will be negligible. The tipping is mostly associated with the ROM at the processing plant vicinity. During these activities factors such as the surrounding wind regime, the material tipping rate, and the moisture content of the material all have an influence on the dust generation at the tipping transfer points.

9.2.1.11 Plant – Crushing and Screening

There are two basic methods of crushing, either compressive or impact. The main types within these categories are:

- Compressive; jaw crushers, single and double toggles, gyratory crushers, cone crushers, roll crushers, ball mills and rod mills.
- Impact; rotary or vertical shaft impactors (e.g. Barmac), hammer mills (fixed or swing hammers).

Compressive crushing produces dust but does not in itself produce a great deal of air movement, but rather the material passing through the crusher causes the dust from the process and the processed material to become airborne. Excessive clearance under the crusher can cause a lot of dust generation in the same way as a high discharge point. Impact-type crushers, for example hammer mills, act as powerful fans and not only produce dust from the impact of hammer on rock, but also blow the dust out.

Screening provides the most difficult dust control problem in mining operations, particularly if dry screening is taking place. Very careful planning of screen layout has to be undertaken to take out the fine cut as early as possible to lessen the dust carried through the screening process and allow the use of water to both clean chip and allay dust, as water is the cheapest form of dust suppression there is. In most cases, the crushing and screening process represents a significant source of fugitive dust with high quantities of respirable fractions released to the atmosphere. Dust sources around the plant, apart from crushing and screening, include discharge into hoppers, long open chutes, and from conveyors and transfer

points. High discharge heights produce an air pressure blast effect and create turbulence, which carries dust into the air. This also causes particle fracture, and free fall allows the wind to pick up and carry the dust for a long distance from the discharge point

9.2.2 Dust Nuisance

9.2.2.1 Particulate Matter

Particulate matter (PM) is the collective name for fine solid or liquid particles added to the atmosphere by processes at the earth's surface. PM includes dust, smoke, pollen and soil particles (Kemp, 1998). PM has been linked to a range of serious respiratory and cardiovascular health problems. The key effects associated with exposure to ambient particulate matter include: premature mortality, aggravation of respiratory and cardiovascular disease, aggravated asthma, acute respiratory symptoms, chronic bronchitis, decreased lung function, and an increased risk of myocardial infarction (USEPA, 1996).

PM can principally be characterised as discrete particles spanning several orders of magnitude in size, with inhalable particles falling into the following general size fractions (USEPA, 1996):

- PM10 (generally defined as all particles equal to and less than 10 microns in aerodynamic diameter; particles larger than this are generally not deposited in the lung);
- PM2.5, also known as fine fraction particles (generally defined as those particles with an aerodynamic diameter of 2.5 microns or less);
- PM10-2.5, also known as coarse fraction particles (generally defined as those particles with an aerodynamic diameter greater than 2.5 microns, but equal to or less than a nominal 10 microns); and
- Ultra-fine particles generally defined as those less than 0.1 microns.

Particles can be classified by their aerodynamic properties into coarse particles, PM10 (particulate matter with an aerodynamic diameter of less than 10 μm) and fine particles, PM2.5 (particulate matter with an aerodynamic diameter of less than 2.5 μm) (Harrison and van Grieken, 1998). The fine particles contain the secondarily formed aerosols such as sulphates and nitrates, combustion particles and re-condensed organic and metal vapours. The coarse particles contain earth crust materials and fugitive dust from roads and industries (Fenger, 2002). An important aspect of the protection of air quality from mining operations is to minimise dust generated from sources such as wind erosion, crushing & screening, vehicles using unsealed roads and blasting. Mines are required by the National Environmental Management Air Quality Act to meet certain criteria for ambient air quality. In order to meet these criteria, mines must manage the emissions of dust from their activities in a competent manner.

9.2.2.2 Impact on Community Health and Amenities

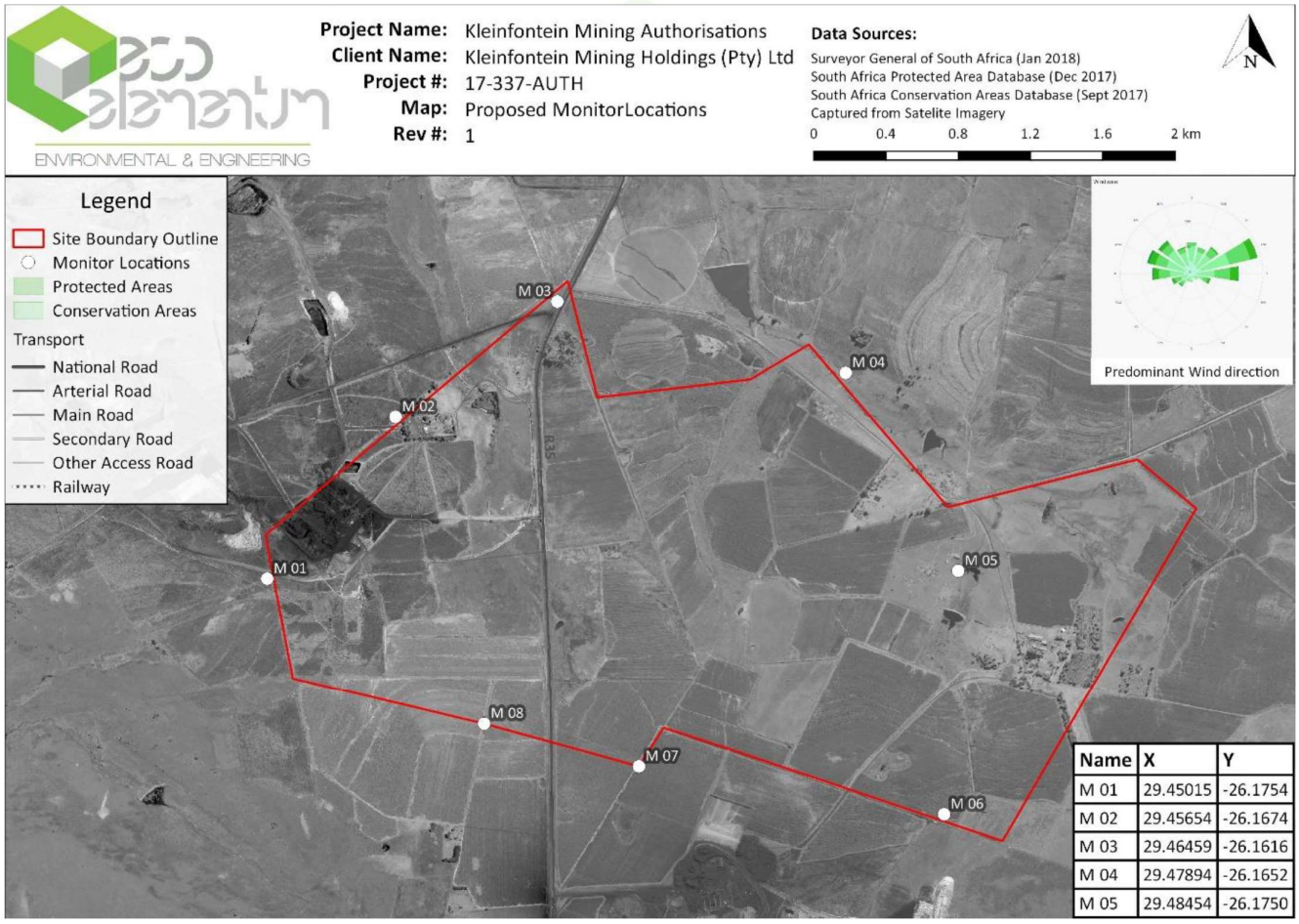
Nuisance dust may be defined as coarse fraction of airborne particulates. Nuisance dust is known to result in the soiling of materials and has the potential to reduce visibility. Nuisance dust has a long history of having little adverse effect on the lungs. Any reaction that may occur from nuisance dust is potentially reversible. However, excessive concentrations of nuisance dust in the workplace may reduce visibility, may cause unpleasant deposits in eyes, nasal passages and may cause injury to the skin or mucous membranes by the chemical or mechanical action. The light is scattered and visibility is diminished by the atmospheric particulate. Various costs are associated with the loss of visibility, including: the need for artificial illumination and heating; delays, disruption and accidents involving traffic; vegetation growth reduction associated with reduced photosynthesis; and commercial losses associated with aesthetics. The soiling of building and materials due to dust frequently gives rise to damages and costs related to the increased need for washing, cleaning and repainting. Dust fall may also impact negatively on sensitive industries, e.g. bakeries or textile industries. Certain elements in dust may damage materials. For instance, it was found that sulphur and chlorine if present in dust may cause damage to copper (Maeda et al., 2001).

An important aspect of the protection of air quality from mining operations is to **minimise dust generated from sources such as wind erosion, crushing & screening, vehicles using unsealed roads and blasting.** Health impacts of mine dust vary depending on the nature of the particles, their origin and their size, which is measured as particulate matter (PM). Exposure to fine particles can have potential health impacts on the respiratory system. Infants and children, elderly people, people with existing respiratory conditions, heart disease or diabetes may be more susceptible to the health effects from fine and coarse particles. Mines must be operated with proper dust controls to ensure that people are not

affected by the dust generated. If not properly managed, dust from mines can be a nuisance to local communities. Nuisance dust usually has a particle size larger than 10 microns (gravimetric dust fallout).

High levels of nuisance dust may reduce visibility and amenity. The presence of nuisance dust can also cause a perceived increase in health risk. The impact of dust from mines on local amenity depends on the distance from the mine site and climatic conditions including wind speed and direction. Concerns about amenity from mine site dust often relate to the 'visibility' of dust plumes and dust sources. Visible dust is usually due to short-term episodes of high emissions, such as blasting. Other amenity impacts include dust depositing on fabrics (such as washing) or on house roofs, and dust transported from roofs to water tanks during rain

9.2.3 Recommended Air Quality Monitoring Locations



Name	X	Y
M 01	29.45015	-26.1754
M 02	29.45654	-26.1674
M 03	29.46459	-26.1616
M 04	29.47894	-26.1652
M 05	29.48454	-26.1750

9.2.1 Topography

The topography in the district can be described as gently undulating with slopes with inclinations varying between 3° and 10°. It is characteristic of the post-African erosion surface back-working into the African surface, which remains preserved in places on the higher lying interfluves. The colliery itself is characterised by gentle slopes mostly towards the east with the Olifants River valley bottom situated to the west. The elevation ranges between 1550-1670.2 masmsl.

The Olifants River (flowing west of the site in a south-north direction) and the Northern Leeuwfontein Spruit (flowing east-west direction) is situated the north of the property where it eventually confluences with the Olifants River towards the northwest. The south-flowing Eastern Leeuwfontein

Spruit runs through the eastern boundary of the mine and joins the Olifants River on the south-eastern boundary of the mine. Various non-perennial streams occur on site including wetlands and natural spring areas. The land capability classes range from arable, wetland and grazing. The majority of the area in and around the mine is used for farming and grazing.

The preferential path of drainage of the site follows the topography in a north westerly direction

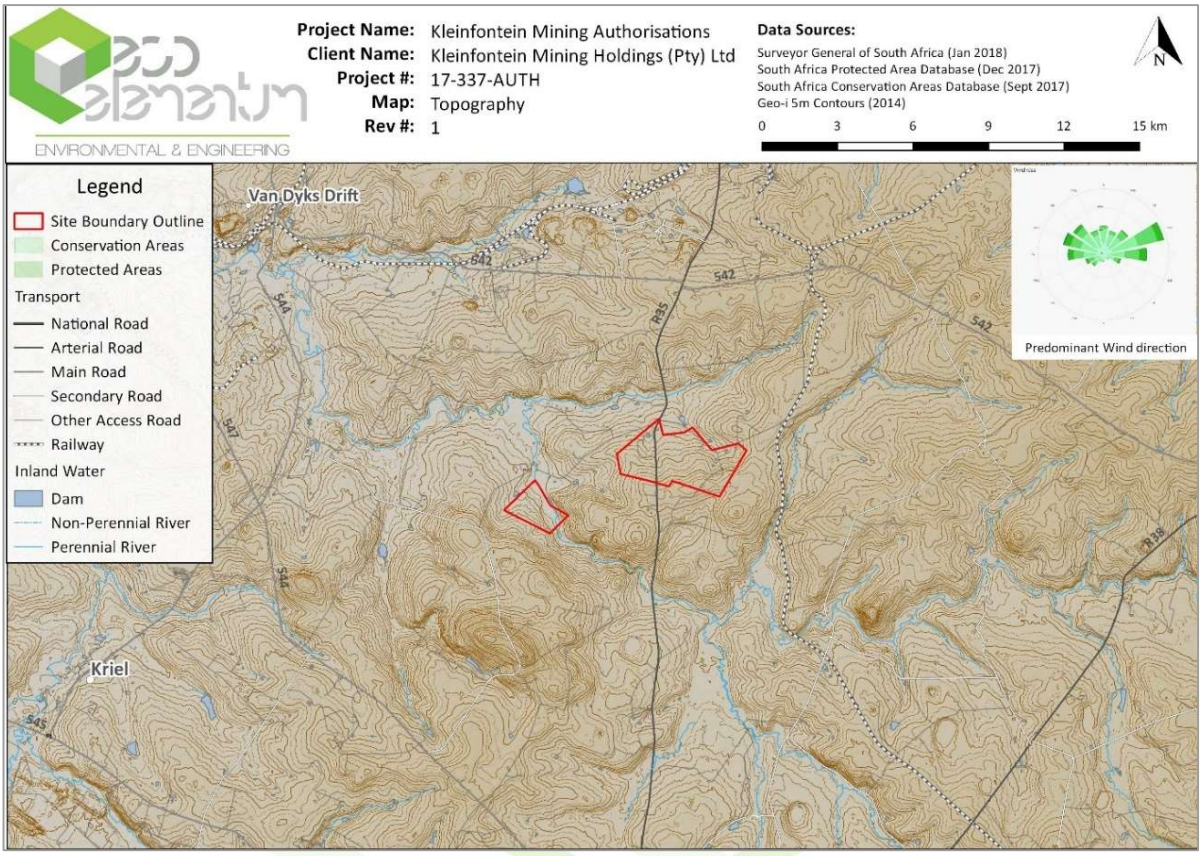


Figure 35: Site Elevation and Infrastructure

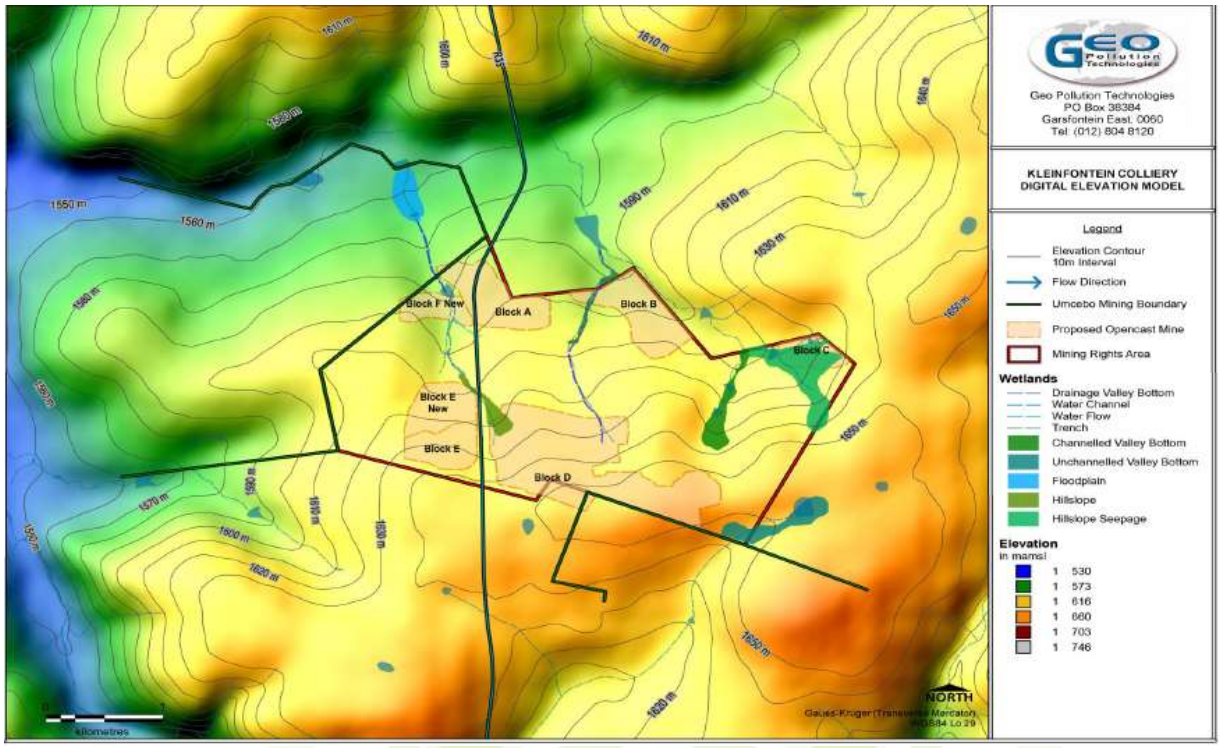


Figure 36: Digital Elevation Model

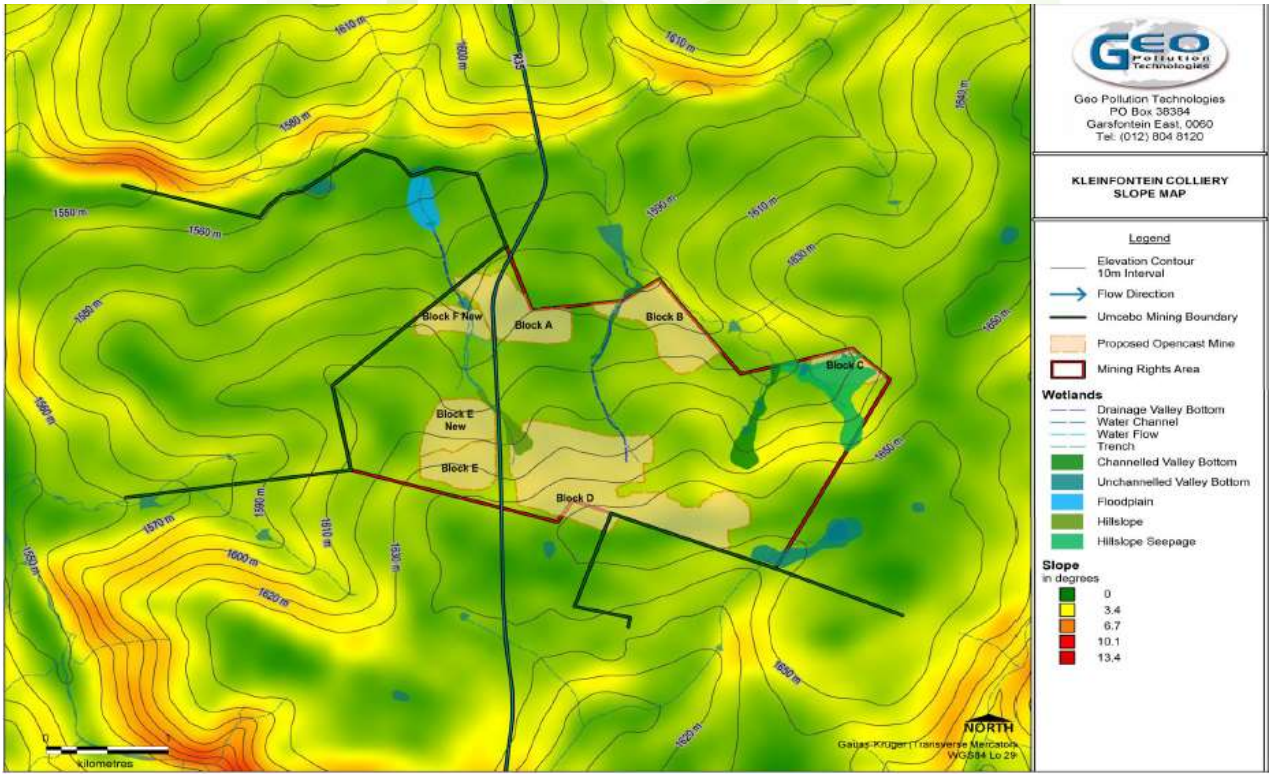


Figure 37: Slope Aspect Map

9.2.2 Geology

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. Coal bearing strata of the Witbank Coalfield as contained within the Vryheid Formation of the Ecca Group. The Vryheid formation varies from 60m to 200m in thickness in the area and consists of alternating sandstones and shales. Is estimated that the coal reserve in the area is 16.3million tons

The geology within the mining boundaries can be described as follows:

- The majority of the surface area is covered by Vryheid formation shales and sandstones containing the mineable coal seams
- On both the eastern and western sides Vaalian diabase ins present'
- A dolerite sill present to the north, which displaced some of the sedimentary layers

The predominant and economic seams present in the area include the No. 1, 2 and 4 seams. The No. 3 and 5 seams are in general absent in the area of interest. Eskom with the target of providing premium Eskom spec of 22.5MJ/kg CV (Calorific Value)

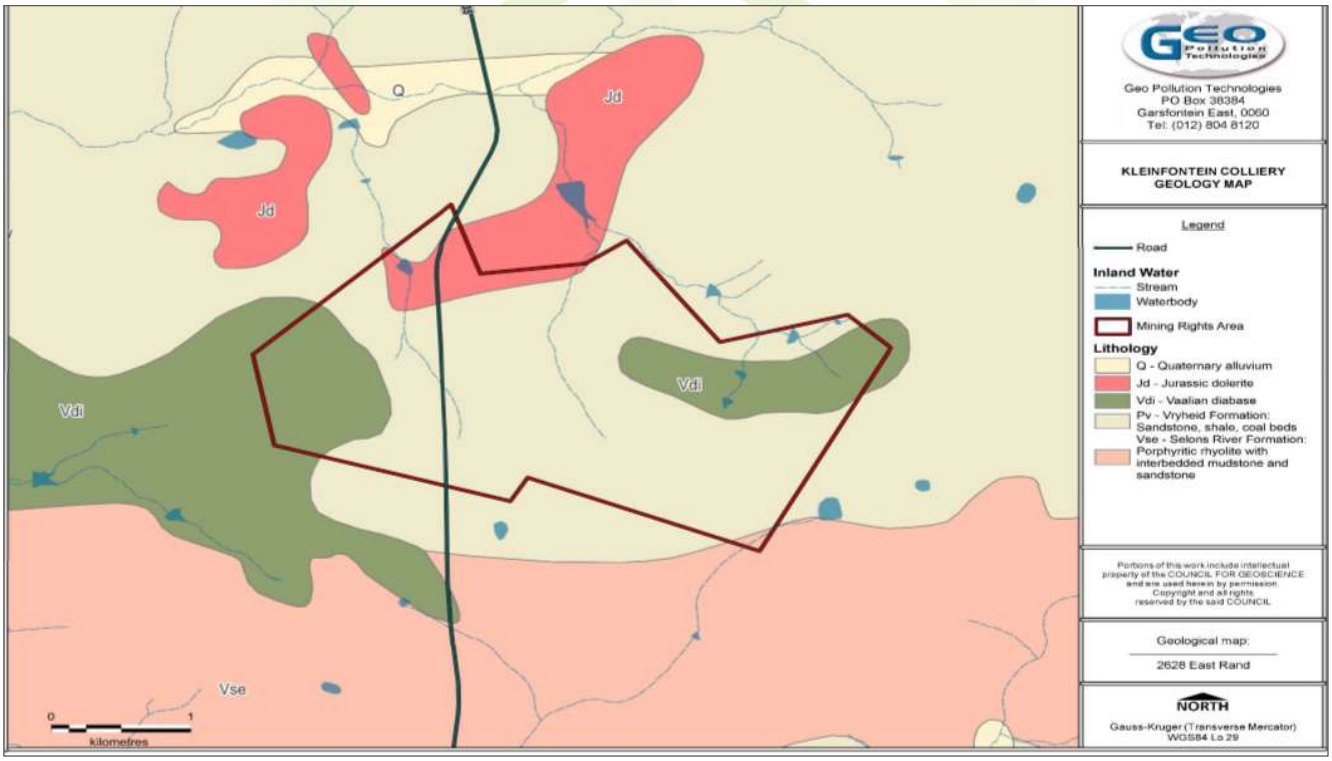


Figure 38: Geological Map

9.2.3 Drilling Results of 2017

During further invasive drilling and exploration activities on the Jicama mining area new geological information became available which resulted in the mining layouts to be altered to ensure optimal mining and utilisation of the available coal resources

9.2.3.1 #4U Seam

The No.4U seam is well developed over the resource area. It has an average mineable thickness of 1.8 metres. The coal qualities are poor due to interbedded shale and sandstone bands and the coal should be de-stoned for possibly the Eskom market. The roof consists mainly out of a thick, medium grained, white sandstone layer which would form a fairly competent roof in the case of an underground mine.

9.2.3.2 #4L Seam

This seam lies underneath the No.4U seam and in most cases, a thin mudstone/shale parting (±1m) separates these two seams from each other. This seam forms about 40% of the total resource tonnages in the area. Mudstone in-seam partings are sometimes present in the upper part of the No.4L seam. These layers have a raw ash content of well over 40% and were excluded in the selection of mineable seam thickness. Roof conditions generally are poor because of the overlying mudstone and shale bands between the 4U and 4L seams.

9.2.3.3 #2 Seam

The No.2 seam lies about 15-20 metres below the No.4L seam. It contributes roughly about 60% towards the total resource tonnages. Dolerite intrusions and the effects thereof also played a major role when defining the seam boundaries. The strata between the 4L and 2seams consist mainly out of sandstone and shale layers with the shale predominantly towards the base. Total thickness of up to 9 meters were intersected by boreholes but that includes layers of shale and shaly sandstone. These layers, which occur mainly towards the top of the seam, were excluded where it exceeds an Ash content of 40%. These layers will form the roof in the case of an underground mine operation. The selected horizon has an average thickness of 3.45 m and the coal qualities vary from medium to high in places. The seam has a good export potential as well as a medium to high places. This seam has good export potential as well as a middling's product for power generation on the local markets.

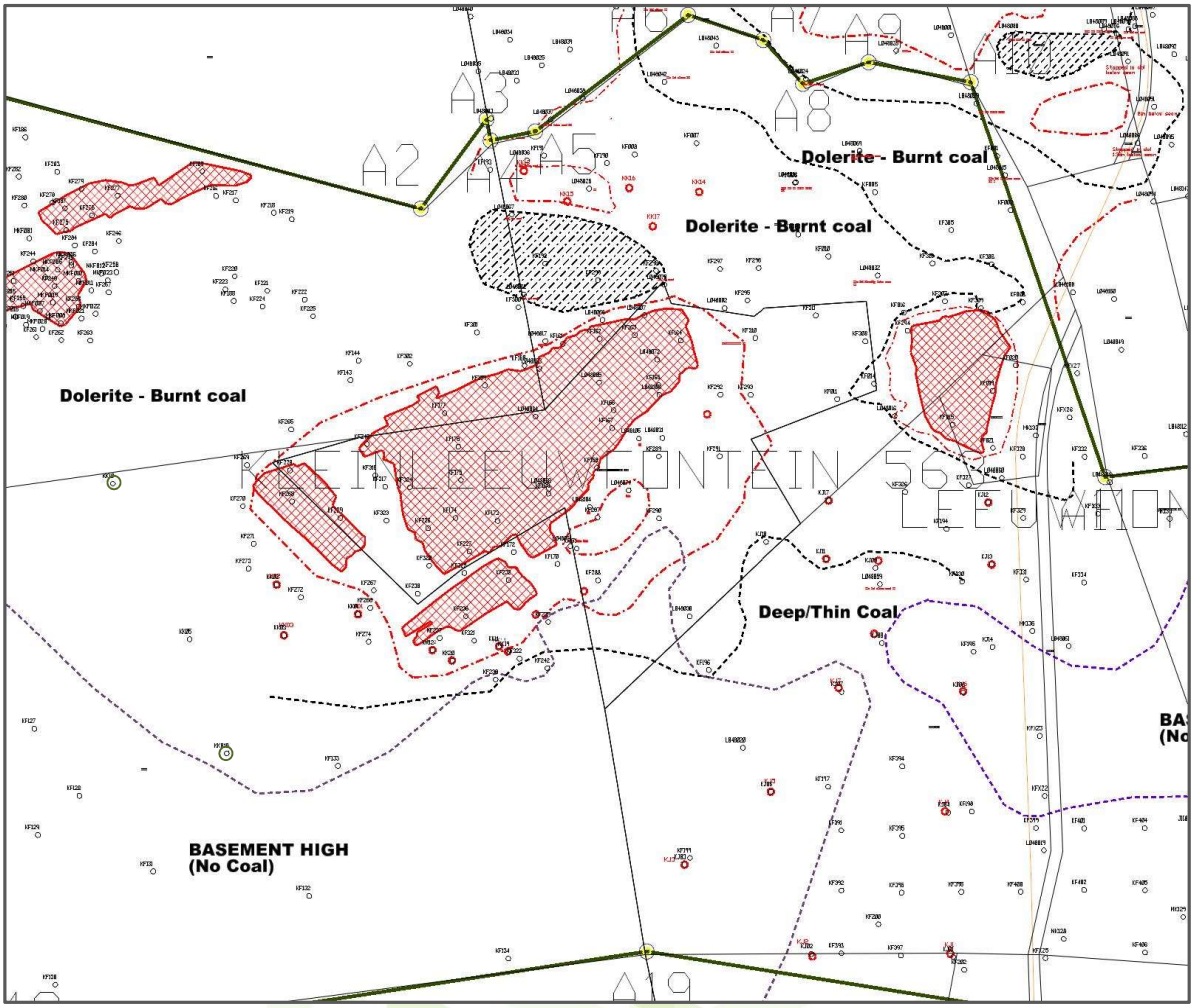


Figure 39: Drilling Sites 2017

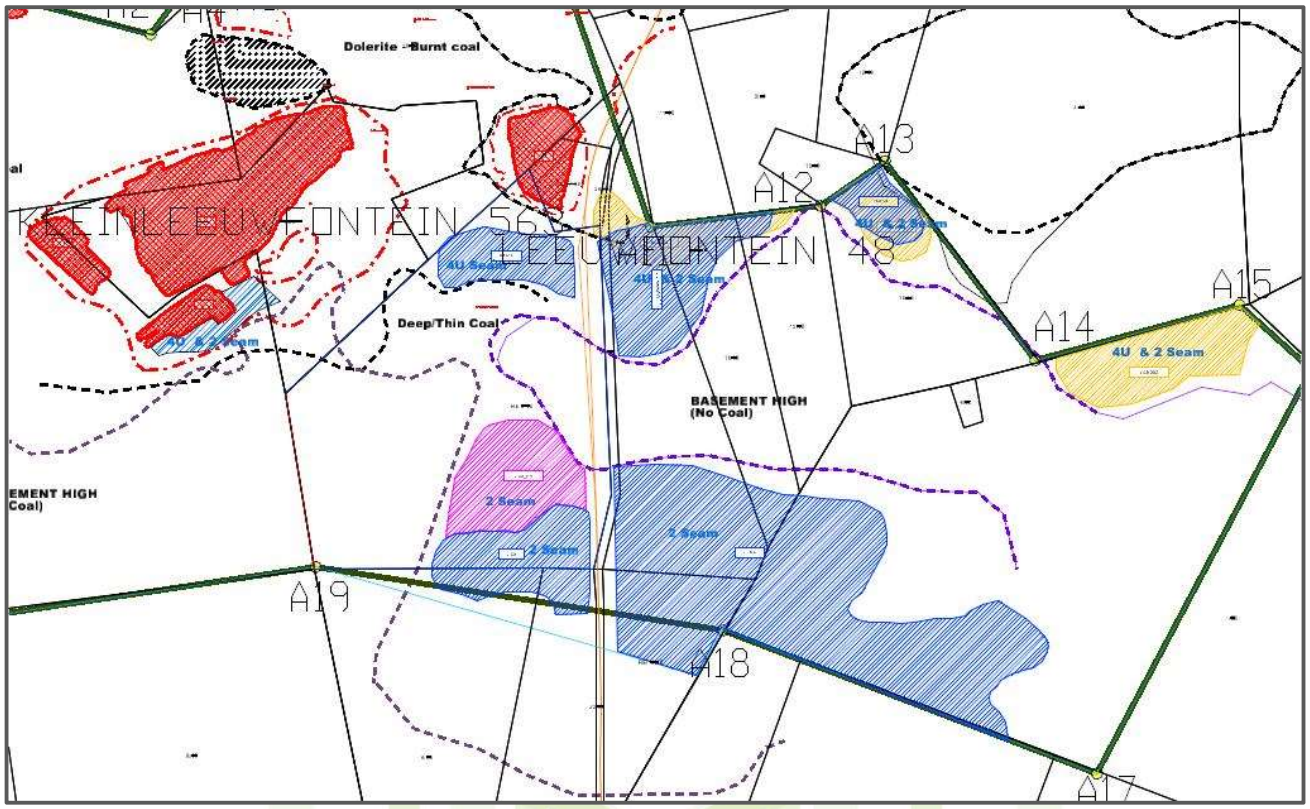


Figure 40: Potential Resource Blocks Identified in 2017

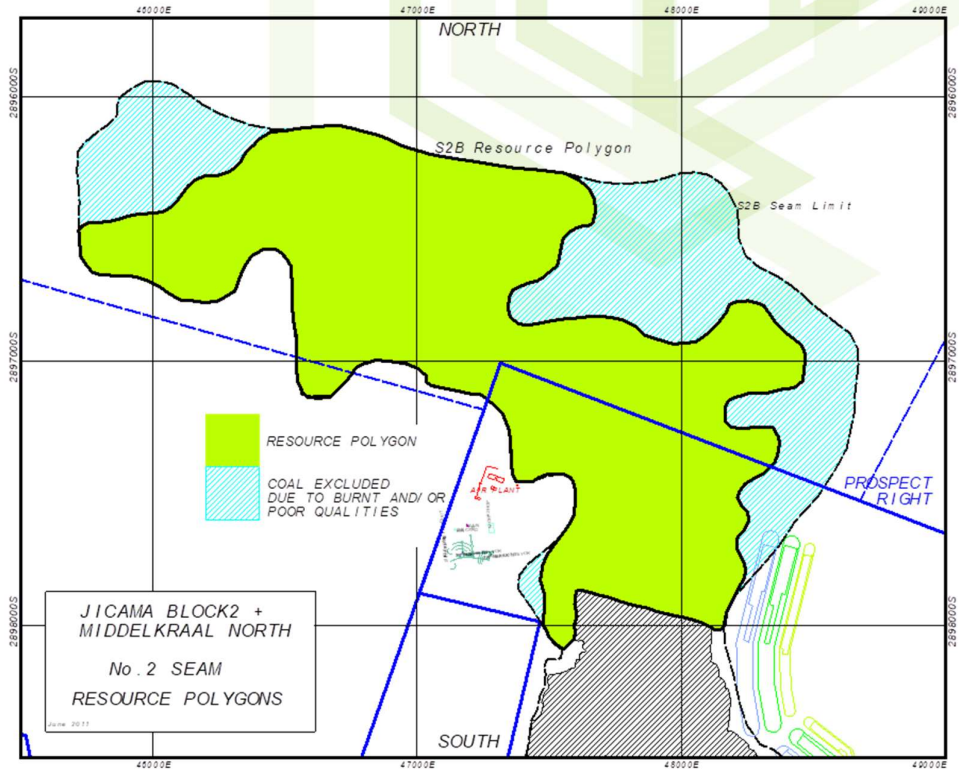


Figure 41: Jicama Block 2 (Middelkraal) Resource Map

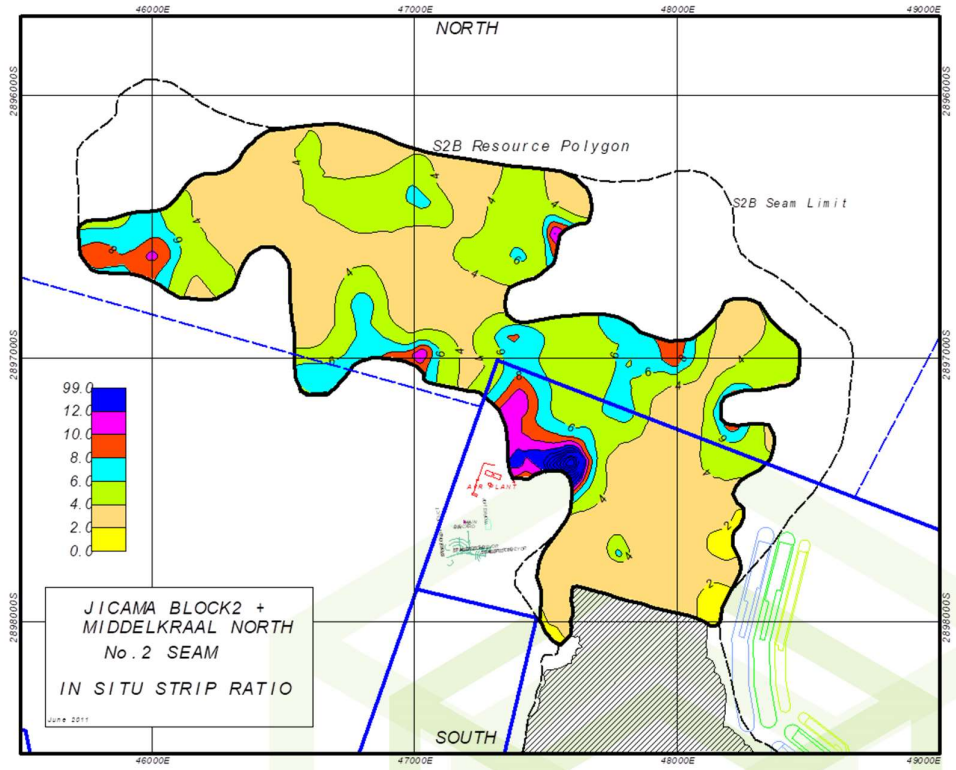


Figure 42: Jicama Block 2 (Middelkraal) Strip Ratio

9.2.4 Geochemistry

During the Groundwater Investigation Report of 2018 (Geo Pollution Technologies), thirty-nine (39) samples were collected from various lithologies at Kleinfontein Mine including:

- 14 coal seam samples;
- 6 sandstone samples;
- 1 sandstone and shale sample;
- 12 shale samples;
- 6 slurry and discard samples.

The following results are applicable to the mineralogy composition on site:

- Quartz (SiO_2) is present as a major mineral in the shale and coal, but as a dominant mineral in the sandstone samples. The quartz grains generally have a detrital origin and originate from the felsic mother rock;
- • Kaolinite ($Al_2Si_2O_5(OH)_4$) is present as a major mineral in the clastic rocks, but as a dominant mineral in the coal samples. Generally, a good correlation between the ash and the kaolinite content in the coal is present in the Vryheid Formation coal. Kaolinite is generally precipitated by authigenic processes during coal formation;
- • Mica (muscovite - $KAl_2(Si_3Al)O_{10}(OH,F)_2$) and K-feldspar ($KAlSi_3O_8$) are present in all clastic rock samples but only in a few coal samples. K-feldspar forms an incomplete solution series with albite, and will often contain small amounts of Na. K-feldspar have a detrital origin and originate from the felsic mother rck
- Plagioclase ($(Na,Ca)(Si,Al)_4O_8$) is only present in one shale sample as a minor mineral. The plagioclase will typically be higher in its Na content than Ca (e.g. oligoclase composition);
- Chlorite (e.g. chamosite - $(Fe^{2+},Mg,Fe^{3+})_5Al(Si_3Al)O_{10}(OH,O)_8$) or chlinochlore - $(Mg,Fe^{2+})_5Al(Si_3Al)O_{10}(OH)_8$)) is present as a minor mineral in some shale and coal samples.
- Chlorite typically forms due to recrystallisation of certain clay minerals;

- Calcite (CaCO3) and dolomite (CaMg(CO3)2) were detected as trace to minor minerals in several of the samples. Siderite (FeCO3) is present as a minor mineral in several samples. Siderite may contribute to Mn in the mine water as Mn often replaces some of the Fe in the siderite. Siderite does not contribute to neutralization of acid rock drainage as it only neutralizes the acid generated by the oxidation of its own Fe;
- Rutile and anatase (both TiO2) are Ti-oxides and have a detrital origin; and
- Pyrite as a trace mineral is generally elevated in coal with respect to clastic rocks due to forming under reducing conditions. Pyrite is present as a trace mineral and was detected in all the samples. Pyrite can form during or very shortly after peat accumulation (autigenic) or as veins later in the coal's burial history (epigenetic).

9.2.5 Potential for Acid Mine Drainage

The following is noted by Geo Pollution Technology Report (2018):

- 89%, 0% and 11% of the coal borehole samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- 33%, 0% and 67% of the sandstone samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- 42%, 25% and 33% of the shale samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- 100%, 0% and 0% of the coal stockpile samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- •00%, 0% and 0% of the coal discard samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- The weighted average clastic rock will not become acidic.
- However, if the NP of one outlier is omitted, the weighted average clastic rocks has a medium potential to generate acid-mine drainage.

Overall, it could be concluded that the coal and shale interburden have a significant potential to generate acid mine drainage. If left open to the atmosphere, the opencast pits will generate acidic drainage/seepage. Mitigation measures like flooding with water after closure and capping of mine waste with a soil layers will be crucial to avoid significant sulphide oxidation and subsequent acid mine drainage generation

9.2.6 Soil Forms and Land Capability

A total of 15 soil types based on dominant soil form and affective depth were identified during field observations and were named Hu1, Hu2, Cv1, Cv2, Av1, Av2, Av3, MsR, Dr, Tu, Lo, Wa, Fw, Ka and Rg. The land capability of the pre- mining activities (2008) was classified as arable, grazing and wetland types. Refer to Table 22 below. In the 2008 EIA process, Evidence of misuse was identified during the ecological assessment and site sensitivity assessment for the proposed site. The same was found in one area where there are prominent rocky outcrops. While the permanent and seasonal zones of the wetlands are in good condition, the temporary zones have been degraded by the presence of livestock, encroachment of maize farming, invasion by exotic species and the construction of dams resulting in a homogenous vegetation pattern.

Table 22: Areas and percentages of land capability classes (pre-mining)

Areas and Percentages Comprised by Land Capability Classes						
Land Capability Code	**Land Capability Class**	***Soil Types**	**Broad Soil Group Description**	**Unit Count**	**Area (ha)**	**Area (%)**

A	Arable	Hu1, Hu2, Cv1, Av1, Av2	Moderately deep to very deep red and yellow soils with moderate to high agricultural potential	6	195.69	68.77
G	Grazing	Vc2, Av3, Ms/R, Dr, Tu	Shallow and stony soils with low agricultural potential	7	24.35	8.56
Wet	Wetland	Lo, Wa, Fw, Ka, Rg	Grey, mottled, imperfectly and poorly drained soils as well as black clay soils showing signs of seasonal or prolonged wetness.	7	64.51	22.66
Wil	Wilderness	None	-	0	0.00	0.00
Total				20	284.55	100.0

9.2.7 Results of the Soil Assessment 2018

A Reconnaissance Soil Assessment (auguring) was undertaken by Geo Pollution Technologies (GPT, 2018) either to confirm whether an area was classified as a wetland or to delineate the boundaries of the wetland. The soils encountered within the region are characterised by shallow, sandy and poorly drained with a marked effect on the vegetation. The terraces of the tributary of the Olifants River are covered by deep, poorly drained, vertic clay with black topsoil overlying dark greyish, gleyed, calcareous subsoil of the Rensburg form (soil code Rg). Although the local soil water table has been lowered due to the incision of the river channel (therefore assuming the subsoil is presently displaying relic gleyed properties), the rusty streaking of the upper topsoil is proof of waterlogged conditions prevailing for long periods during the rainy season. The soils encountered within the project area have a low arable land use. The hydrophyllic vegetation was associated mainly with the seasonal and temporary wetland zones and permanent/semi-permanent return water dams or paddocks. There is a low abundance and frequency of hydrophyllic plants in all temporary wetland zones (Menco, 2018)

Photo 4: Soil Observation Point 4 (2018 study)

Photo 5: Permanent waterlogged soil sample

9.2.7.1 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.

9.2.8 Regional Vegetation

Kleinfontein Colliery is situated within the Moist Cool Highveld Grassland Ecoregion (Kleynhans *et al* 2005). The terrain morphology of Hills and Ridges (Moderate and High Relief) as well as Lowlands support vegetation types such as Eastern Bakenveld with intrusions of Turf Highveld in the south, Mixed Bushveld and Sourish Mixed Bushveld veld types in the north.

9.2.8.1 Hyparrhenia hirta Grassland:

This tall grassland occurs over vast areas, usually on shallow, leached soils on the Johannesburg granite dome, and on undulating north-facing warm andesitic lava slopes of the Suikerbosrand, Witwatersrand and Klipriviersberg areas. Disturbed grassland or other disturbed areas such as

road reserves or fallow fields, not cultivated for some years, are also usually *Hyparrhenia* dominated (Coetzee *et al*. 1995; Bredenkamp & Brown 2003).

This *Hyparrhenia* – dominated grassland may appear to be quite natural, but they are mostly associated with an anthropogenic influence from recent or even iron-age times. This grassland is characterised by the tall growing dominant Thatch grass (*Hyparrhenia hirta*), and Bankrupt Bush (*Stoebe vulgaris*), an invader dwarf shrub which usually indicates grassland"s degraded condition (Bredenkamp & Brown 2003). This grassland mostly has low species richness, with only a few other species able to establish or survive in the shade of the dense sward of tall grass. Most of these species are relict pioneers or early seral species.

9.2.8.2 Eragrostis plana Moist Grassland:

The *Eragrostis plana* grassland is well represented occurring mainly in high rainfall parts of the study area. It is usually restricted to flat plains or bottomlands, mostly on moist, deep, clayey and poorly drained, seasonally wet soils, adjacent to wetlands and seasonal as well as perennial rivers. *E.plana* is conspicuous, often dominant member of this grassland type. *Paspalum dilatatum* and *Cynodon dactylon* are often present on degraded sites.

9.2.8.3 Cymbopogon plurinodis-Themeda triandra Grassland:

The *Cymbopogon plurinodis-Themeda triandra* grassland occurs on flat or undulating plains with deep, non-rocky soils. These grasslands are relatively poor in plant species, though, since due to the arable soils, much has been destroyed for agricultural purposes. This type of grassland is very widely distributed over the interior plateaus of South Africa and is characterised by grasses such as Turpentine grass (*Cymbopogon plurinodis*) and *Eco Elementum (Pty) Ltd: Kleinfontein Colliery: Wetland Delineation Report Trichoneura grandiglumis* and some forbs (O"Connor & Bredenkamp 1997). The dominant grass is mostly Red grass (*Themeda triandra*), with *Eragrostis curvula*, *Heteropogon contortus*, *Setaria sphacelata* and *Aristida congesta* also conspicuous (Coetzee et al. 1995; Bredenkamp & Brown 2003).

9.2.8.4 Monocymbium ceressiforme-Loudetia simplex Grassland:

This high-altitude grassland is found throughout the study area on rocky midslopes of ridges and hills. The soils are often shallow with high rock cover (up to 60% in some cases). This vegetation is found mostly on cooler slopes, but also occurs on the warmer north-facing slopes where scattered individuals of dwarf shrubs are present. This grassland is dominated by a range of grass species including the grasses *Monocymbium ceresiiforme*, *Digitaria monodactyla*, *Loudetia simplex*, *Trachypogon spicatus, Eragrostis racemosa, Andropogon shirensis, Schizachyrium sanguineum, Brachiaria serrata* and *Themeda triandra,* and woody dwarf shrubs such as *Protea welwitschii, Lopholaenia coriifolia*, and the geoxylophyte *Parinari capensis.*

9.2.8.5 Themeda triandra-Acacia karroo Microphyllous Woodland:

Acacia karroo-dominated woodlands are found on colluvial soils on footslopes, in bottomland plains and as riparian vegetation along streams and rivers. This vegetation type occurs over a wide range of soil and terrain types with low rock cover, but is mostly associated with moderately deep and often clayey, high nutrient, alluvial soils. This open woodland is characterised by trees such as *Acacia karroo* and *Ziziphus mucronata* dominating the woody layer. Typical grasses include *Themeda triandra* and *Setaria sphacelata*.

9.2.8.6 Grassy Pan Veld

This sweet grassland is dominated by White Buffalograss (*Panicum coloratum*), Lovegrass species (*Eragrostis curvula, E. plana*), *Setaria nigrirostris* and *S. spacelata*. Redgrass (*Themeda triandra*), is also present but is not as dominant on the clayey soils as on the deeper red sands. Lovegrass (*Eragrostis spp*.) dominates when overgrazed and in cases of severely degraded veld, Three-awn Rolling grass (*Aristida bipartita*) dominates.

9.2.8.7 Riparian shrub on stream and riverbanks:

This riparian shrub community dominates the stream and riverbanks. Exotic trees such as Bluegums (*Eucalyptus camaldulensis*, *E. sideroxylon*) and the Weeping Willow (*Salix babylonica*) are present together with indigenous shrubs such as *Salix mucronata*, *Diospyros lycioides, Rhus pyroides, Lycium hirsutum, Acacia karroo, Combretum erythrophyllum* and *Ziziphus mucronata*. Grasses such as white Buffalograss (*Panicum coloratum*), Lovegrass species (*Eragrostis lehmanniana, E. obtusa*), *Setaria nigrirostris* and *S. spacelata* are also present *erythrophyllum* and *Ziziphus mucronata*. Grasses such as white Buffalograss (*Panicum coloratum*), Lovegrass species (*Eragrostis lehmanniana, E. obtusa*), *Setaria nigrirostris* and *S. spacelata* are also present.

9.2.8.8 Seepage areas and wetland communities:

Seepage areas are seasonally wet areas that occur in sandy areas where water seeps into low-lying drainage lines after rains. These areas are usually covered by sedges and reeds. The dominant sedge in the study area is *Juncus rigidus*. Sometimes bulrush (*Typha capensis*) and reeds (*Phragmites australis*) also occurs. Wetlands are of a more permanent nature and occur in the low-lying areas such as tributaries of streams and rivers. Typical plants are the Orange River Lily (*Crinum bulbispermum*), bulrush (*Typha capensis*) and reeds (*Phragmites australis*), sedges of the *Cyperus, Fuirena* and *Scirpus* genera also occur.

9.2.8.9 Anthropogenic areas dominated mainly by exotic plants:

These sites are usually highly disturbed. Different types of roads and tracks (secondary, tertiary and tracks) cut through the study area. These areas are cleared of any vegetation but in some areas groves of Bluegums were planted along the roads. Large groves of exotic trees, mainly Bluegum trees and Wattle trees, also occur around these sites.

Table 23: Biome and Bioregion Status

Biome	Bioregion	Protection Status	Threatened Status
Eastern Highveld Grassland	Moist Cool Highveld Grassveld	1.38%	Endangered

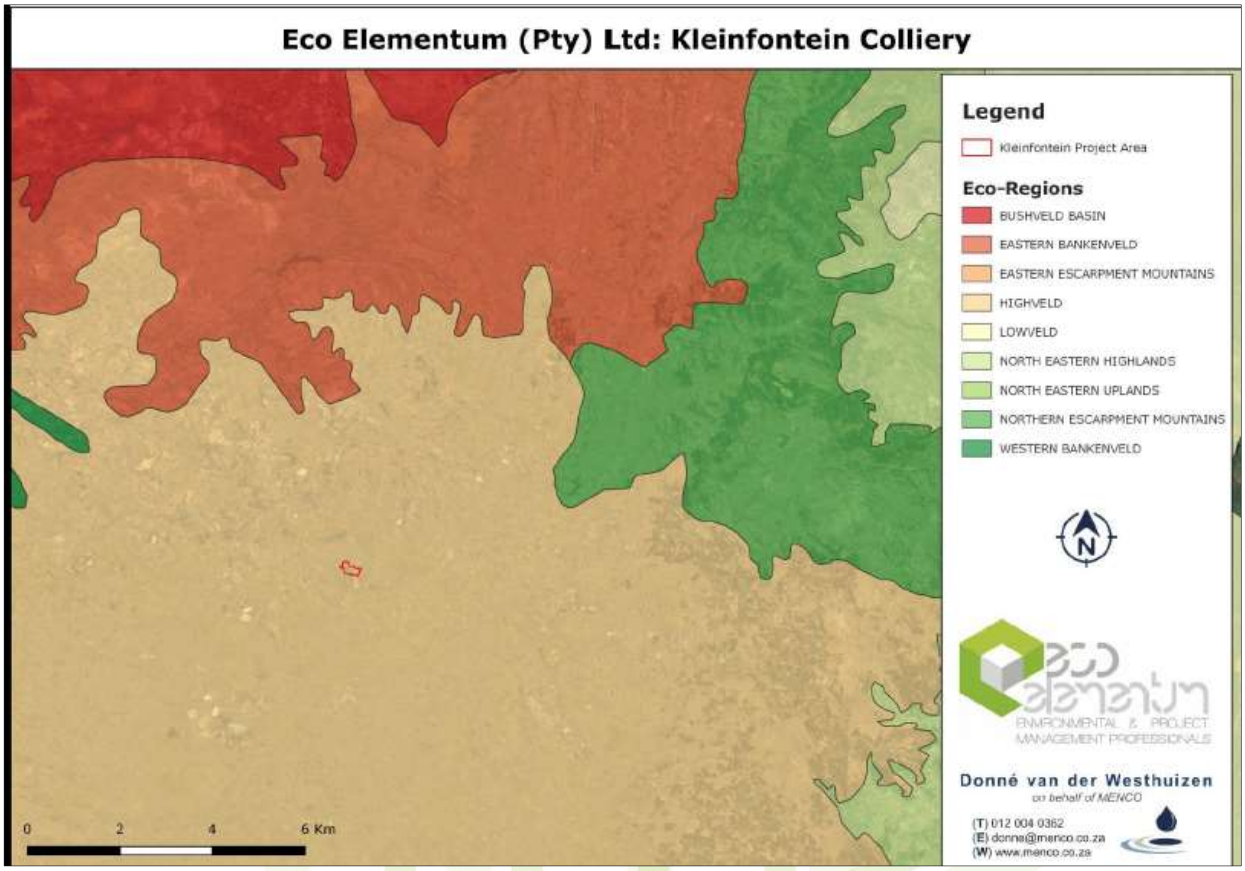


Figure 43: Overview of Ecoregion in relation to the site

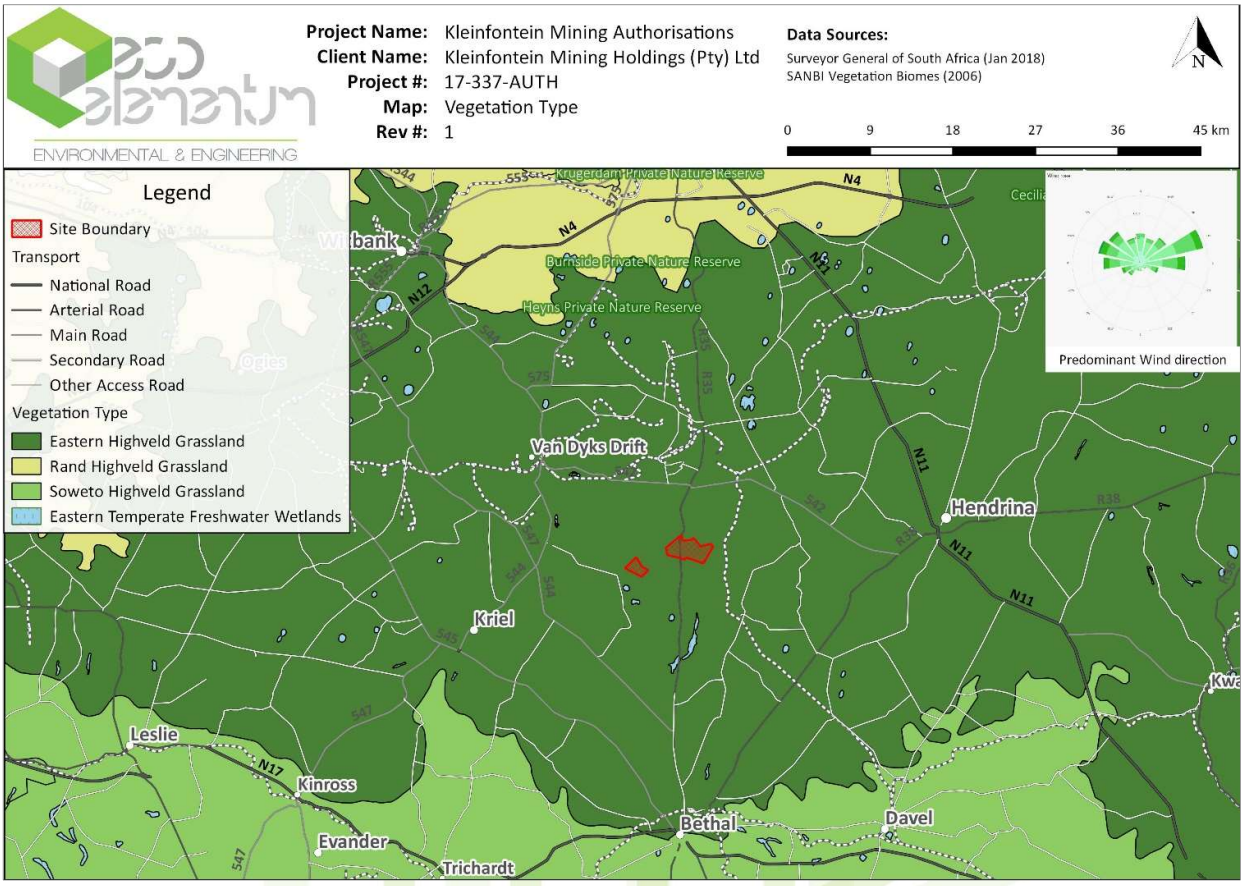


Figure 44: Regional Vegetation Types

9.2.8.10 Mpumalanga Biodiversity Conservation Plan (MBCP).

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 (see Figure 45)

- Heavily modified (cultivated lands).
- Moderately Modified – Old Lands
- Other Natural Areas; and
- CBA Irreplaceable area

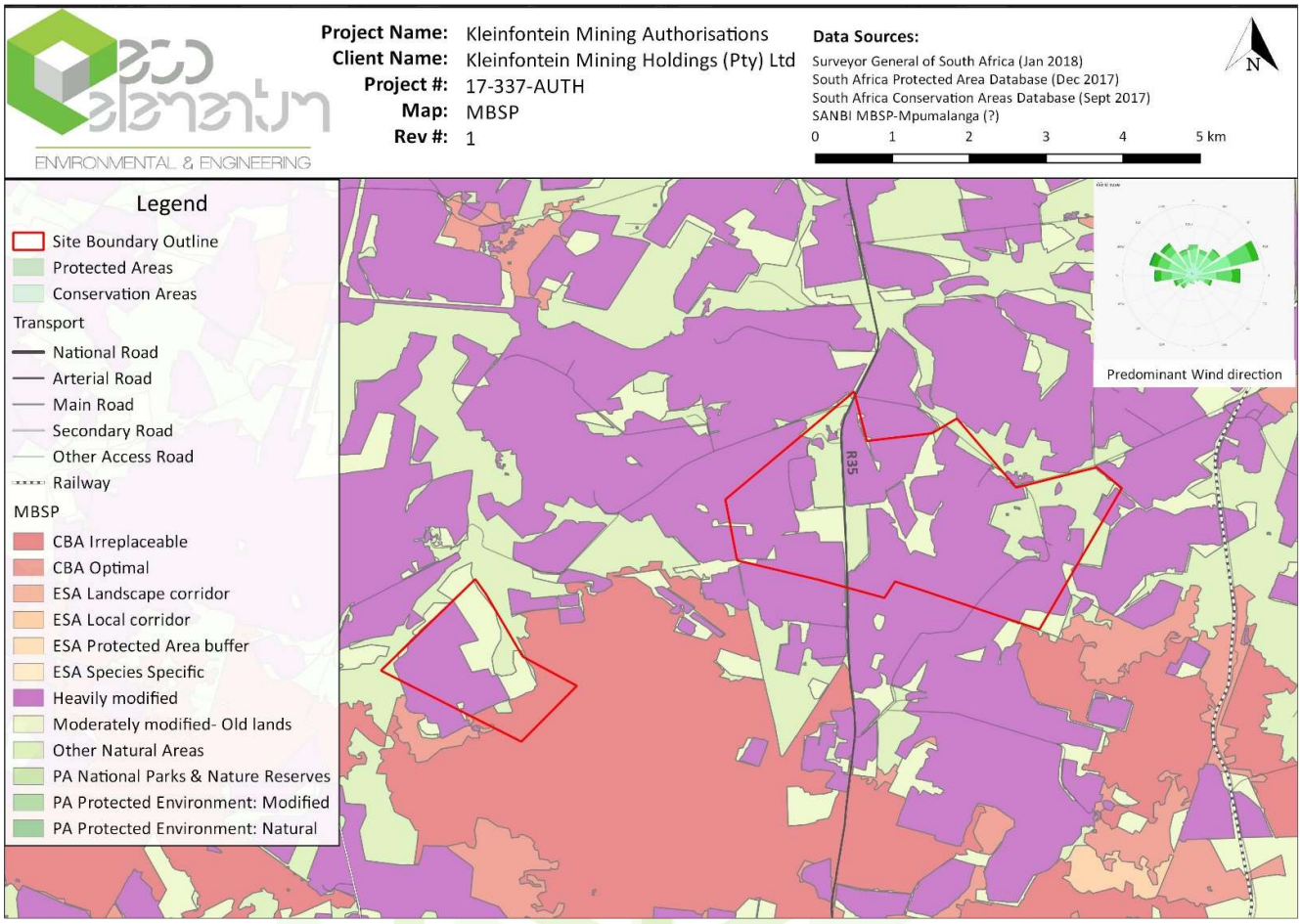


Figure 45: Vegetation Classification (Mpumalanga Conservation Plan)

9.2.9 Vegetation on Site

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).

A buffer of 100m is to be left around the wetland, indicated on the NFEPA map

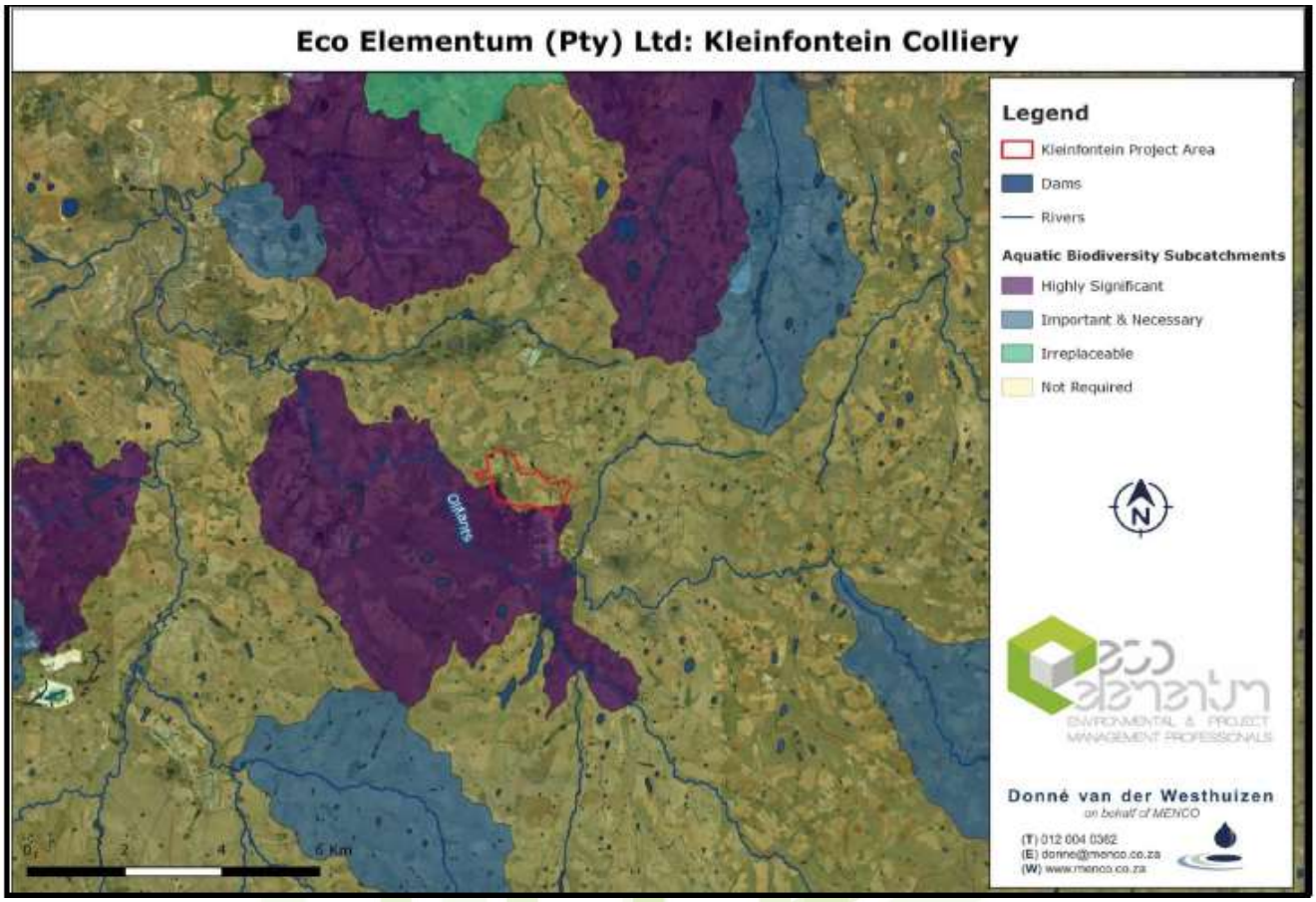


Figure 46: Aquatic Biodiversity Sub catchments

9.2.9.1 Aquatic Vegetation

Previous Bio-monitoring assessments were done in 2012 to 2015 for the dry and wet season by Carin Bosman Sustainable Solutions and was used as comparative bio monitoring information during this assessment. The following in field findings were observed and indicates the lack of certain characteristics at the monitoring sites (Aquatic Study,2018) by Menco

- During the extent of the bio-monitoring event it was evident that there were very small differences regarding the SASS and ASPT scores between the upstream and the downstream sites. This might be indicative that external mining activities and farming might be one of the key contributors to affecting the overall health status of the associated River systems.
- The water quality was also classified as being fair to good throughout the extent of the four (4) sites. With the SASS5 results being classified as a Class C this might also indicate that the current water quality related to Kleinfontein isn't having a significant accumulative effect on the macro invertebrate habitat.
- During the extent of the bio monitoring assessment it was clear that recent flood conditions affected the sampling ability related to the Olifants River. Recent flood conditions caused water levels within the upstream and downstream Olifants River to be deeper than usual. This meant that water depth restricted the SASS5 practitioner's ability to sample all the applicable biotopes to some extent.
- The Leeuwfonteinspruit was also considered to be in a fairly dry state with stagnant pools being fairly common at the upstream site. The current habitat assessment also suggested that there is a fairly strong possibility that the upstream Leeuwfonteinspruit might be dry during the dry season assessment. Weathering and erosion effects at the downstream Leeuwfontein site also produced a salt layer which could have potentially influenced the water results. During the bio monitoring assessment only four (4) sensitive aquatic macro invertebrate specimens were found. Despite a lack of sensitive specimen, the SASS scores provided acceptable results.
- This might indicate that most of the specimens sampled were fairly similar within each site and that mostly tolerable to slightly sensitive specimen was sampled at each site.
- Previous bio monitoring data suggests that the Health Class regarding the Olifants River applicable to the Kleinfontein site has decreased from a class B to a class C over the last few years. Previous seasonal conditions as well as current bio monitoring data results does however suggest that external factors situated

- upstream of the applicable Olifants River site might be viewed as key contributors to a decreased health rating. The recommended ecological state with regards to the B11B catchment is set as a Class C thus the current obtained health status is of an acceptable nature.
- There was a limited amount of water chemical levels considered to be non-compliant to the WUL. There were however some chemicals which were regarded as having very high readings. It is important that Kleinfontein Colliery thus complies to the limit se in the WUL for all the applicable water chemicals.

Table 24: Bio-Monitoring Sampling Sites

Sites	Descriptions	Latitude	Longitude
KFLS1	Upstream site in Leeuwfonteinspruit. This site is situated approximately 200m above any influences of any mine related activities.	-26.152377°	29.467548°
KFLS2	Downstream site in Leeuwfonteinspruit. The site is situated just before the Leeuwfonteinspruit confluences with the Olifants River downstream of the mines activities.	-26.158232°	29.426317°
KFOL1	Upstream site in Olifants River. This site is situated approximately 200m above any influences of any mine related activities.	-26.179006°	29.454754°
KFOL2	Downstream site in Olifants River. The site is situated just before the Olifants River confluences with the downstream Leeuwfonteinspruit .	-26.158232°	29.426317°

Table 25: Results of Aquatic Monitoring

Analyses in mg/L			Sample Identification:			
Sites	KFOL1	KFOL2	KFLS1	KFLS2	KF02	RQO's
pH – Value at 25°C *	8.0	7.9	7.8	8.2	7.7	6.5 -9.0
Electrical Conductivity	34.8	31.3	34.7	**116**	49.5	<90
Suspended Solids at 105°C	**29**	**73**	**79**	14.7	**59**	<25
Turbidity in N.T.U	28	**52**	19	3.2	26	<50
Chloride as Cl	13	12	17	17	**30**	<20
Sulphate as SO_4	77	64	11	463	9	<600
Nitrate as N	0.1	<0.1	<0.1	<0.1	<0.1	<6
Nitrite as N	<0.05	<0.05	<0.05	<0.05	<0.05	-
Dissolved Oxygen as O_2 *	6.6	6.7	6.2	7.2	6.1	≥6
Sodium as Na	20	17	18	41	34	<60
Iron as Fe	0.734	**1.04**	**1.39**	0.153	**1.03**	<1

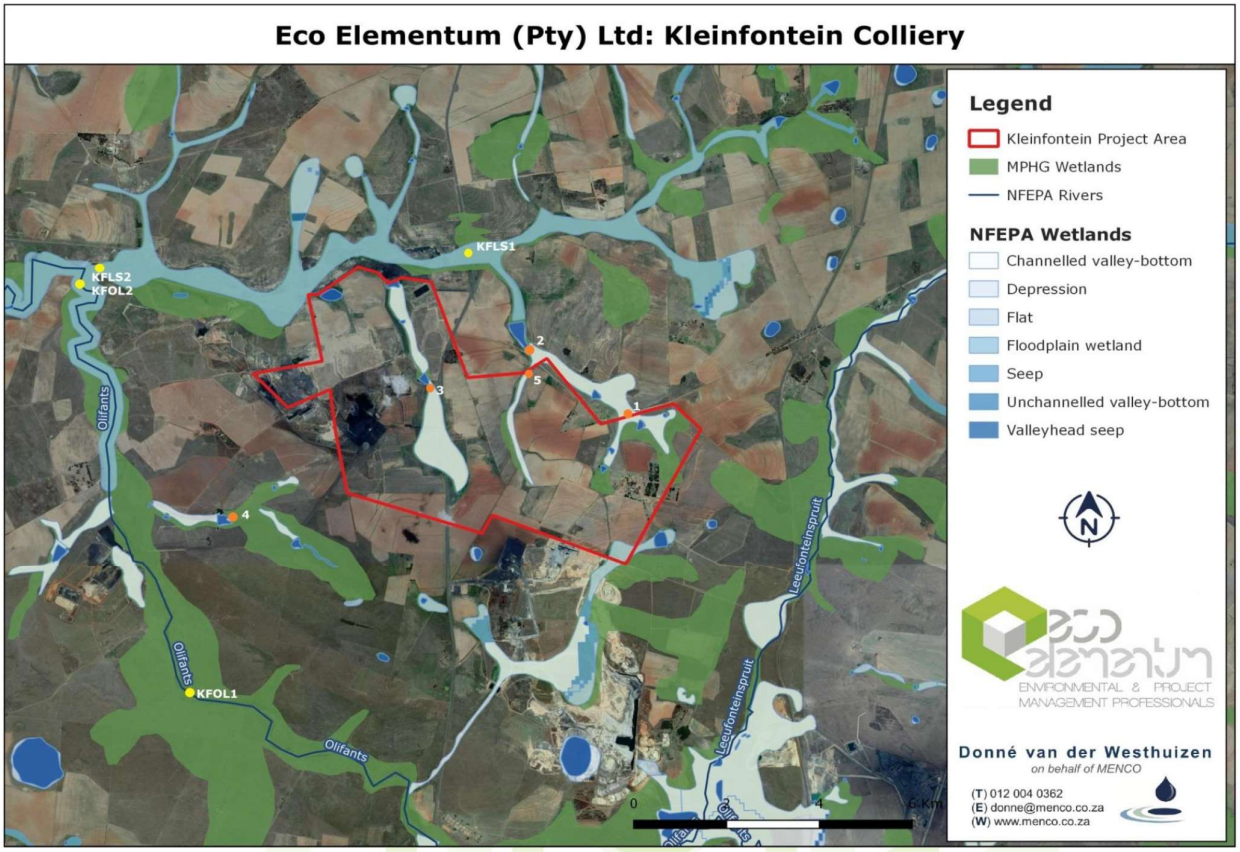


Figure 47: Bio-Monitoring Sites and Additional Sites Monitored

9.2.9.2 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.

9.2.10 Fauna and Avifaunal

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. Three species of conservation-important mammals was confirmed by the Virtual Museum records namely the Endangered Oribi, Near-threatened Southern African Hedgehog and Near-threatened Serval. These species are likely to occur in the vicinity, but not likely on the proposed mining area, as the site has already been disturbed and heavily modified. Three species of conservation-important mammals was confirmed by the Virtual Museum records namely the Vulnerable Black-footed Cat, Near-threatened Southern African Vlei Rat and Near-threatened Swamp Musk Shrew. These species are likely to occur in the vicinity, but not likely on the proposed mining area, as the site has already been disturbed and heavily modified.

Three (3) Red-List Category birds were found in the Desktop study for QDS 2629AB, and are as follows: Curlew Sandpiper (Near threatened), Southern Bald Ibis (Vulnerable), Greater Kestrel (Vulnerable) and Secretarybird (Vulnerable).

No species of conservation-important reptiles of amphibians were recorded.

9.2.10.1 Faunal Impacts

Refer to section under “Vegetation Impacts”.

9.2.11 Surface Water

According to the South African National Biodiversity Institute"s (SANBI) Atlas for Freshwater Ecosystem Priority Areas (Nel, e*t al* 2011), the project area is situated within the B11B quaternary catchment. Rivers and wetlands within this quaternary catchment (B11B) are considered as Freshwater Ecosystem Priority Area (FEPA). The B11B quaternary drainage area forms part of the Olifants Water Management Area. The Olifants River originates close to Bethal in the southeast and the main reservoirs in the Upper Olifants Water Management Area is the Witbank Dam (fed by the Olifants River) and the Middelburg which is fed by the Klein Olifants River. The confluence points of the two rivers are situated downstream of the Middelburg Dam

Table 26: Quaternary Catchment Description

Quaternary catchment	River/Stream	Class	Length (km)
B11B	Leeuwfonteinspruit	Non-Perennial	26.2642
	Upper Olifants	Perennial	35.601

9.2.11.1 Olifants Catchment

The Olifants catchment surrounds an area of about 54 570 km2 and is subdivided into 9 secondary catchments with a mean annual runoff of about 2400 million cubic meters. 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.

Table 27: Description of Olifants River and Tributaries

Component	Description
Main tributaries	Klein Olifants, Steenkool Spruit, Riet Spruit
Catchment size in km^2	1,300 km^2 for Upper catchment
Geology	Karoo sequence and Vryheid Formation
Vegetation	Eastern Highveld Moist Grassland
Mean annual precipitation (mm)	700
Mean annual evaporation (mm)	1400 – 1800 (S-pan)
Mean annual runoff (m^3)	227.8 x 10^6

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) (now called DWS).

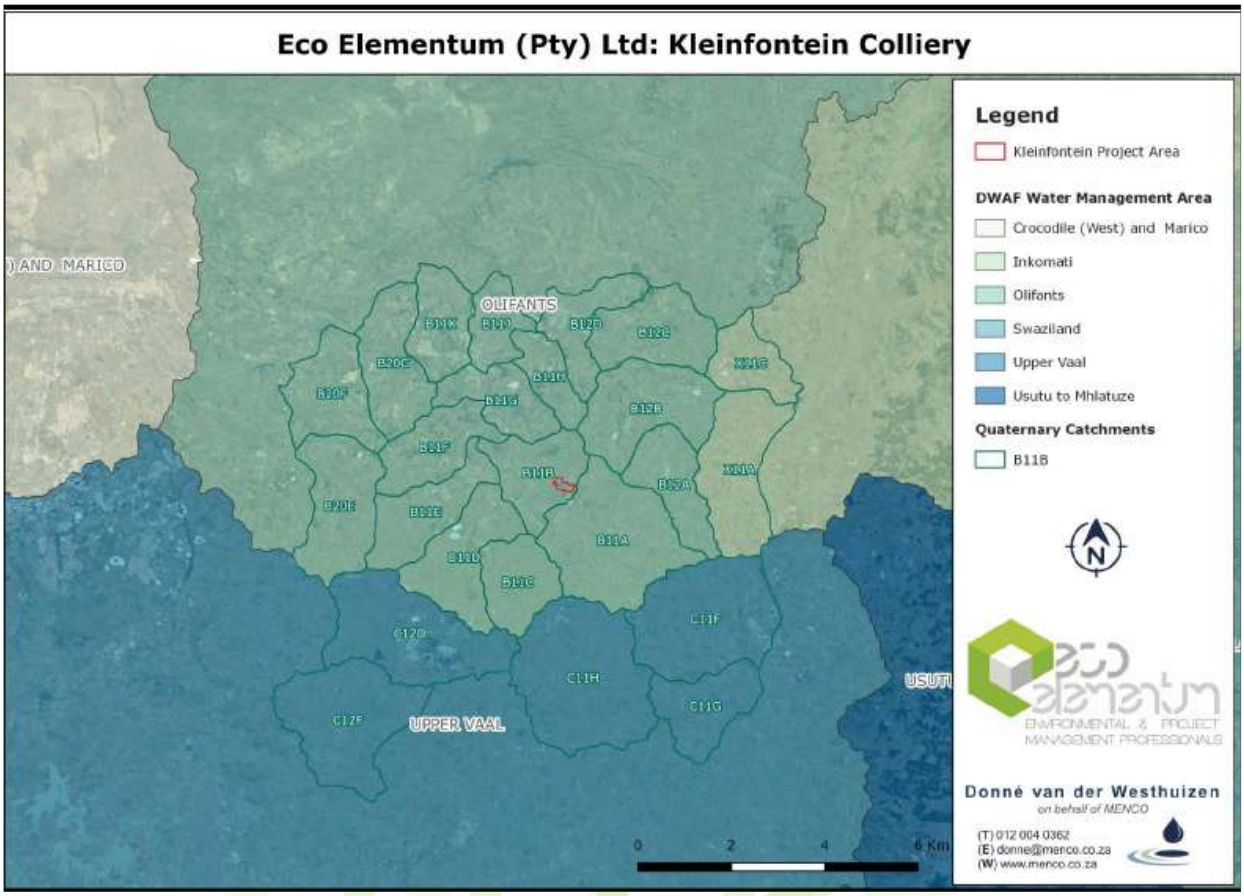


Figure 48: Water Management Areas

9.2.11.1 Leeuwfonteinspruit Catchment (B11B)

A major north-south drainage channel (formed by the Olifants River) is located to the west of the properties. A second west-east drainage channel (Leeuwfontein Spruit) is adjacent to the properties to the north and has its confluence with the Olifants River to the northwest of the site, after which the Olifants continue towards the west and flows into the Witbank Dam. The Witbank Dam is a major water supply source to the EMalahleni Municipality. These two drainage features form the primary surface water runoff tributaries to the catchment.

A small unnamed non-perennial tributary of the Leeuwfontein Spruit drains in a south – north direction through the centre of the property, just west of the R35. Three other small unnamed non-perennial tributaries of the Leeuwfontein Spruit also intersect the eastern side of the properties. An unnamed non-perennial tributary of the Olifants River (Olifants River Tributary) is adjacent to the properties to the south and drains in an east – west direction before joining the Olifants River. Two small unnamed non-perennial tributaries of the Olifants River intersect the western portion of the property and drain this section in a west-east direction. The surface water areas in the area of the project are indicated in Figure 49

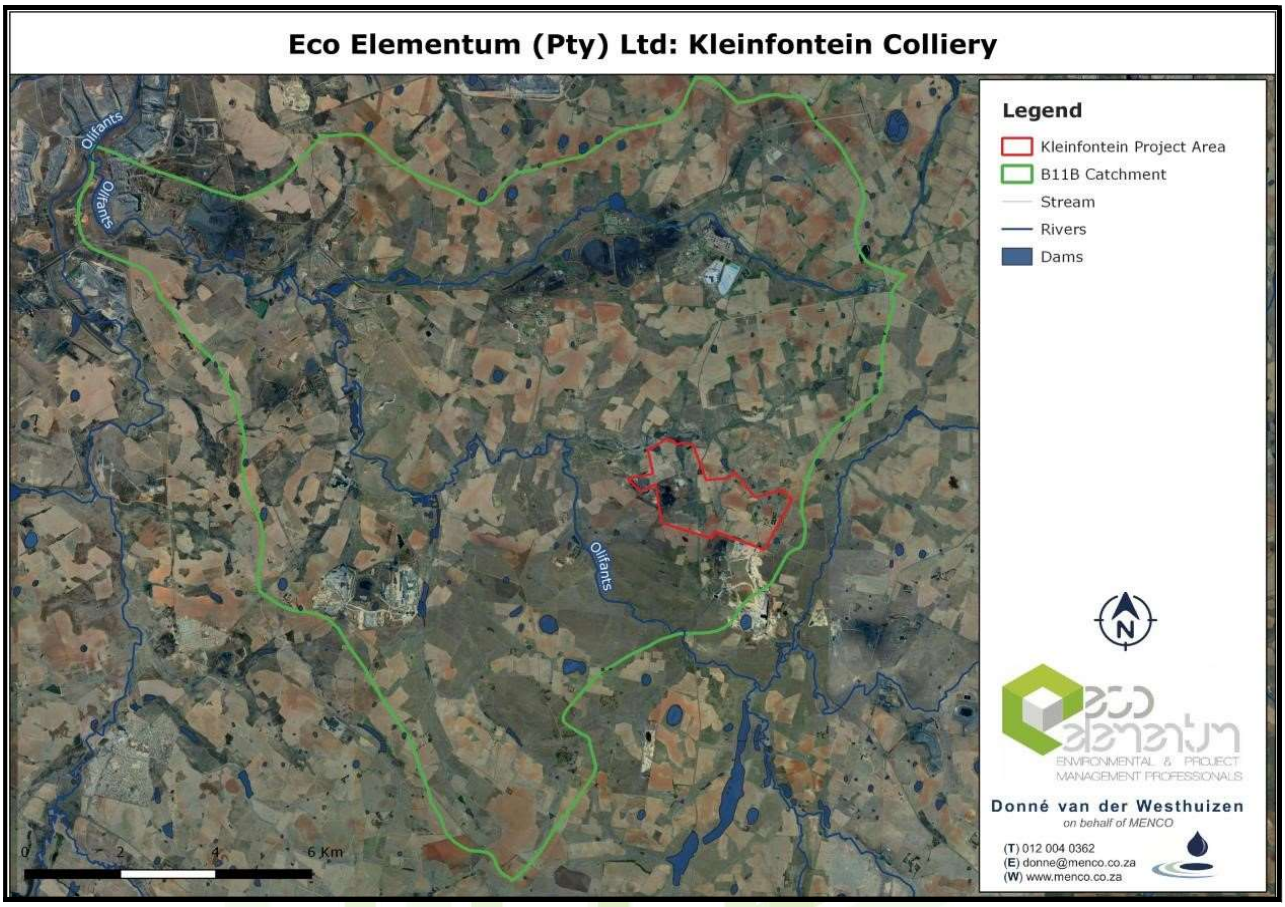


Figure 49: Surface Water Features Within the Vicinity

9.2.11.2 Regional Wetlands

Five (5) regional wetland systems were identified and assessed within the project area (Menco,2018):

- **Wetland 1** is a floodplain wetland system situated at the confluence with the Olifants River and Leeuwspruit. The system is linked with a Channelled Valley Bottom which is fed by a fountain as part of a hill slope situated at the eastern border of Block E New. This wetland will be described in the report as wetland 5.
- **Wetland 2** is a channelled Valley Bottom which is intersected by Block B. Infrastructure such as the Softs and Hard Dumps will be placed within the protective buffer zone.
- **Wetland 3** is delineated as a hill slope seepage with the potential to be impacted by Block C mining activities inclusive of the ROM stock pile as well as the Softs and Hards Dumps.
- **Wetland 4** is delineated as an un-channelled Valley bottom. Mining infrastructure associated with Block D impact on the hill slope linked with the un-channelled Valley Bottom system

From the Wetland Study (Menco, 2018), it is evident that the wetland units located within the mine boundary is regarded as Category 5 and 6 in terms of the Mpumalanga C-Plan. 6. These relate to “Least Concern” and “No natural habitat remaining”. The areas of higher classification (2 – Highly Important) are predominantly surrounding the riparian wetland areas linked with the Olifants River.

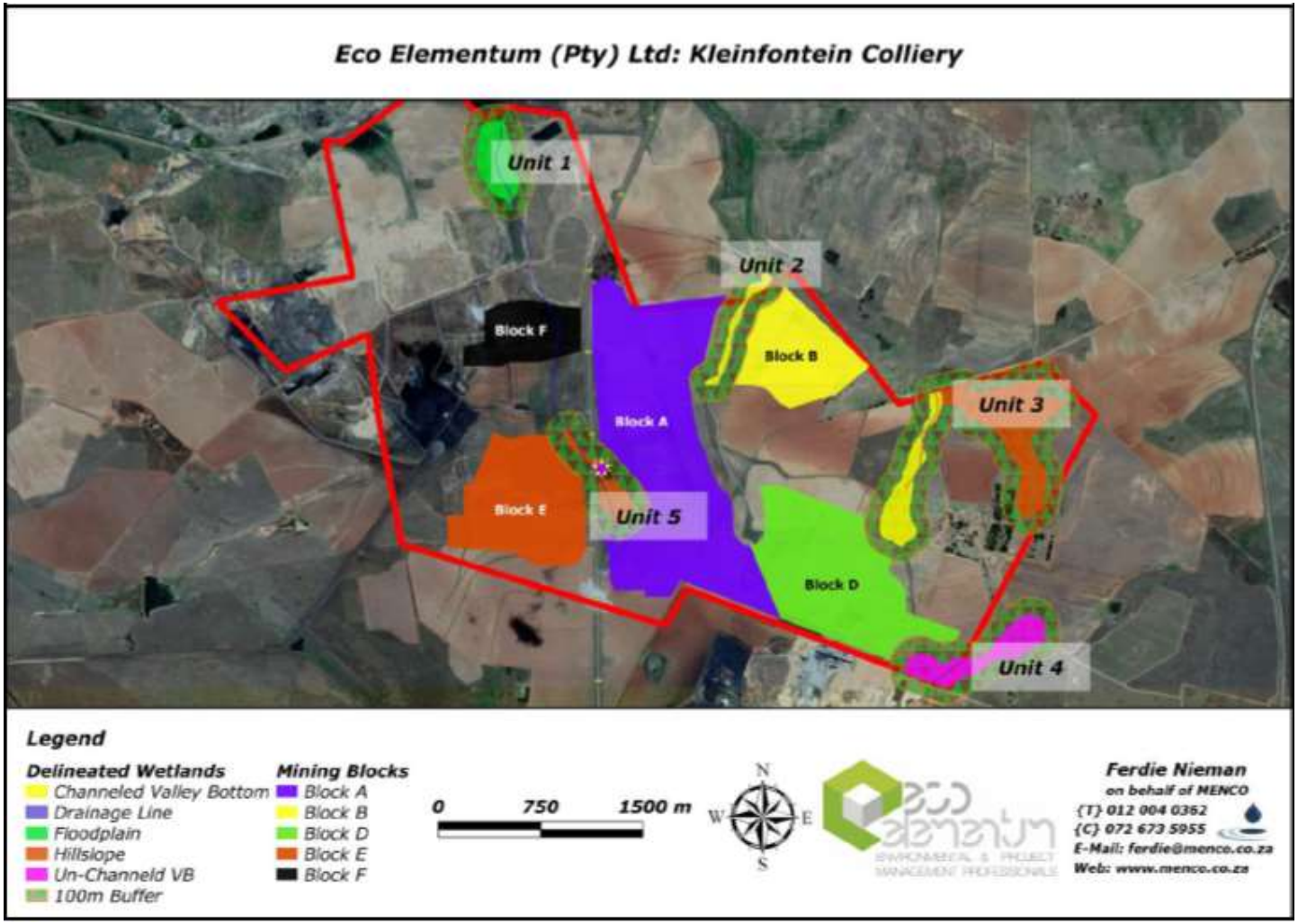


Figure 50: Wetland Units identified on site

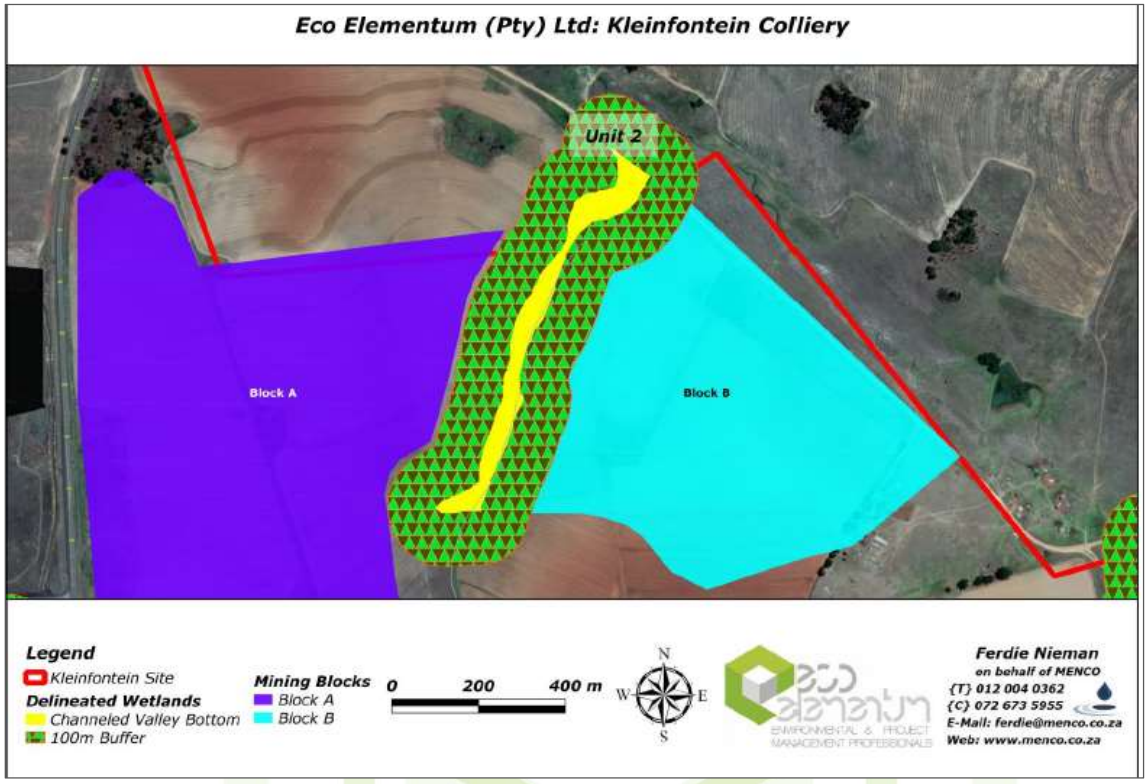


Figure 51: Wetland 2 Delineation (Channelled Valley Bottom)

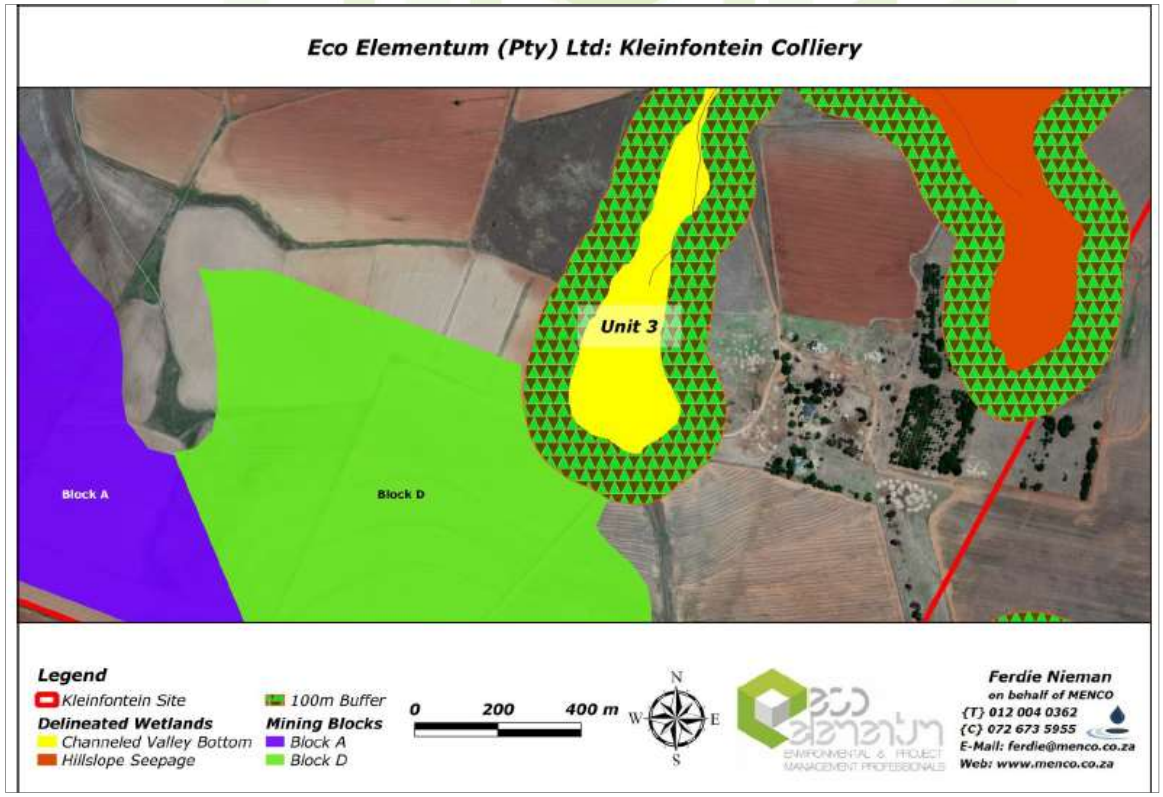


Figure 52: Wetland 3 Delineation (Hillslope Seepage)

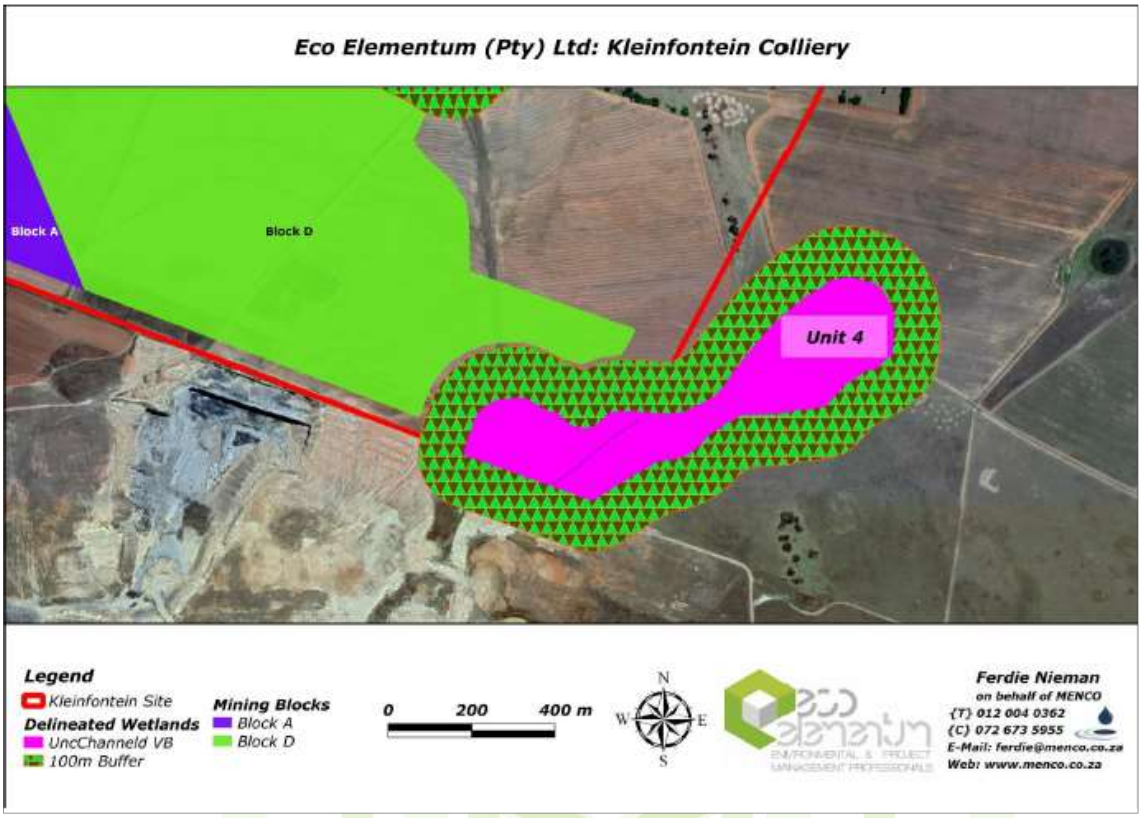


Figure 53: Wetland 4 Delineation (Unchanneled)

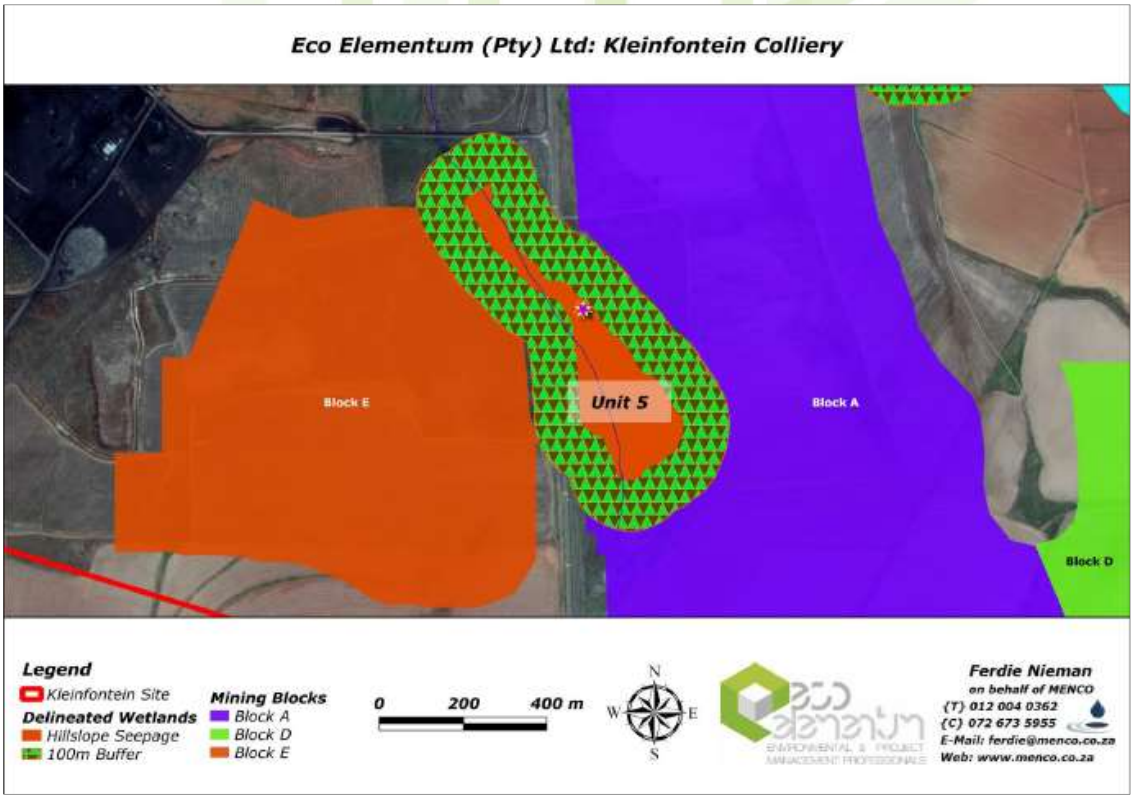


Figure 54:Wetland 5 Delineation (Hillslope Seepage)

The channelled valley bottom system is surrounded by mining and agricultural activities and is maintained by stormwater runoff as well as fountain that feed into the wetland system as seepage runoff. Flow within this wetland is therefore predominantly surface flow, generated as a result of rainfall events. The upper wetland system (wetland 5 – labelled as Wetland 1 on the map) has several functions still intact of which nutrient removal, flow regulation and sediment trapping appear to be most important.

Considering the PES and EISC of the quaternary drainage area as depicted in Table 28, the wetlands within the project area are of **moderate importance** to the ecosystem functioning of the Olifants River, which supplies water to downstream users (agriculture, mining, urban areas and conservation) and therefore must be managed with long term sustainability of these enterprises.

Table 28: Summarised Results of Wetland Assessment

Wetland	PES	EIS			Eco services	
		Ecological Importance & Sensitivity	Hydro-Functional Importance	Direct Human Benefits	Natural	Human
F (1)	C	High	High	Moderate	Moderate (20.4)	Low (8.2)
VC (2)	D	Moderate	High	Moderate	Low (13.7)	Very low (6.7)
H (3)	C	High	High	Moderate	Low (15.8)	Very low (6.5)
H/W (4)	C	High	High	Moderate	Low (12.0)	Very low (6.4)
H (5)	C	Moderate	Moderate	Moderate	Low (14.8)	Very low (6.7)

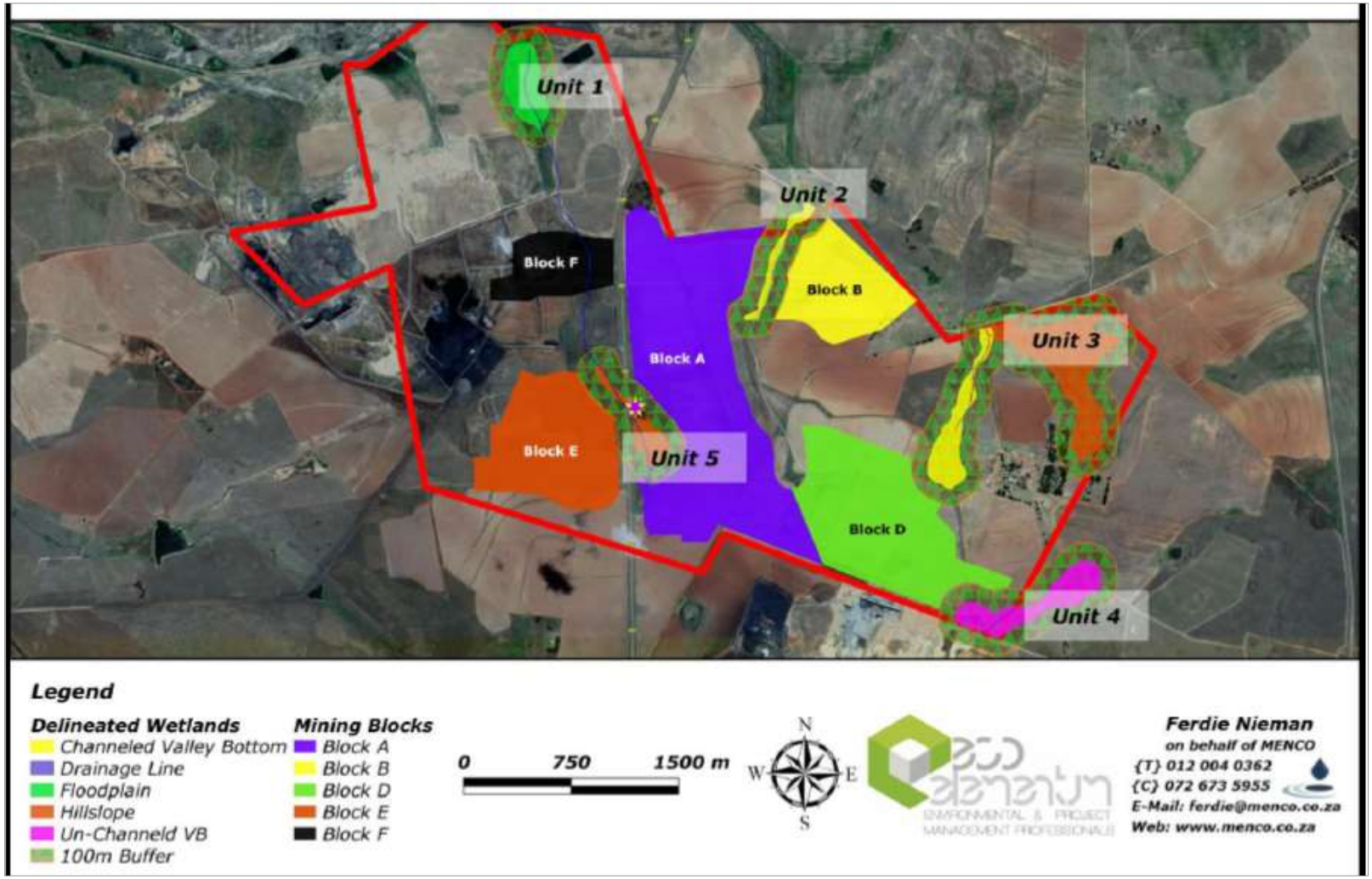


Figure 55: Recommended Wetland Buffers

9.2.11.4 Water Quality and Water Users

Background surface water quality was obtained during the field survey conducted in February 2018. Points were selected in the Leeuwfonteinspruit at an upstream point (KFLS1) and downstream at KFLS2 (Menco,2018). In terms of the RQO's for the Upper Olifants River it is noted that Suspended Solid levels at the upstream point exceeds the limits for the catchment. This is most likely due to the agricultural activities adjacent the Leeuwfonteinspruit. Iron levels also exceeds the RQO (Resource Quality Objectives) 0f 1.0 mg/l for the catchment. It is further noted that there is a significant degradation of water quality in the Leeuwfonteinspruit before the confluence with the Olifants River. Electrical Conductivity increased three-fold and sulphate levels increased by 400%. There is also an increase in the sodium concentration from 18 mg/l to 41 mg/l. These impacts are directly related to the mining activities at Kleinfontein Colliery.

An important surface water use downstream of the project area is Witbank Dam supplying potable water to various municipalities. Other Water Users authorised in the B11B catchment include several mining related activities:

- Komati Power Station for the taking of water (section 21(a);
- Atcom East Colliery for Bridge crossing across Olifants, impacts on hillslope wetland and floodplain (section 21(c) and (i);
- Haasfontein Colliery (Section 21 a, g, j);
- Goedehoop Colliery (Section 21 a, c, i, g and j);
- Exxaro New Clydesdale Colliery (Section 21a, b, f and g); and
- Total Coal Dorstfontein Colliery 21(a, c, i , g and j)

The water quality variables measured in this study are not conducive for healthy ecosystems and is considered to be moderately impaired. This does not only threaten the aquatic biota of the Leeuwfonteinspruit, but also the livelihood of the downstream water users. This is particularly significant when all the users dependent on the Upper Olifants are taken into account. Any uncontained spillage from or polluted storm water systems and run-off from the overburden and discard stockpiles as well as the observed decant will contribute towards degradation of water quality.

Table 29: Background Water Quality Results

Variable	***Unit***	***KFLS1***	***KFLS2***	***RQO***
pH		7.8	8.2	6.5 – 9.0
Electrical Conductivity as EC	mS/m	34.7	116	90
Suspended Solids as SS	mg/l	79	14.7	25
Turbidity	NTU	19	3.2	50
Chloride as Cl	mg/l	17	17	175
Sulphate as SO_4	mg/l	11	463	620
Variable	*Unit*	*KFLS1*	*KFLS2*	*RQO*
Nitrate as NO_3-N	mg/l	<0.1	<0.1	6
Dissolved oxygen as DO	mg/l	6.2	6.7	
Sodium as Na	mg/l	18	41	115
Iron as Fe	mg/l	1.39	0.153	1.0

- New monitoring points for the potential opencast section will depend on the final location of the pit and the storm water management infrastructure. Water pumped from the pit needs to be monitored for quality (monthly) as well as quantity (daily). The quality (quarterly) and quantity (weekly) if water in the proposed storm water dam also needs to be monitored for the variables as indicated in **Table 6-1**.
- Water used for dust suppression needs to be monitored for quality (monthly) and quantity (daily).
- Water levels for all pollution control dams (Weekly).
- Water abstracted from the borehole (daily).

Table 30:Description and location of existing surface water sampling points

Name	Description	Southing	Easting
KFS1	Olifants River US from Old Kleinfontein	26°10'05.30"	29°25'17.46"
KFS2	Olifants DS from old Kleinfontein	26°09'14.48"	29°25'05.04"
KFS3	Olifants after confluence Leeuwfontein	26°09'13.16"	29°25'03.22"
KFS4	Leeuwfontein US confluence below Ilanga	26°09'14.50"	29°25'31.00"
KFS5	Dirty Stormwater D2 US of KFS1	26°09'57.50"	29°25'20.50"
KFS6	Leeuwfontein DS of Old Kleinfontein	26°09'12.50"	29°25'05.90"
KFS7	Water in mini-pit @ Old kleinfontein	26°09'42.48"	29°25'57.28"
KFS8	Washing Plant PCD 3	26°10'12.40"	29°27'14.00"
KFS9	Dirty stormwater D4 DS Kleinleeuwfontein	26°09'25.13"	29°26'56.76"
KFS10	Farm Dam 5 in Olifants tributary	26°11'00.89"	29°26'06.37"
KFS11	Leeuwfontein at Bridge on R35	26°09'09.00"	29°28'04.00"
KFS12	irrigation Dam Jicama Block B	26°09'46.00"	29°28'28.70"
KFS13	DS Block C at confluence Leeuwfontein	26°10'06.40"	29°29'01.40"

KFS14	Farm Dam 2 near Block A	26°10'00.50"	29°27'38.00"
KFS15	Olifants US Otto Block	26°11'41.90"	29°25'43.68"
KFS16	Oifants tributary 2 west of Jicama Otto Block	26°11'02.48"	29°25'05.19"
KFS17	Olifants US of river crossing	26°10'36.20"	29°25'14.45"

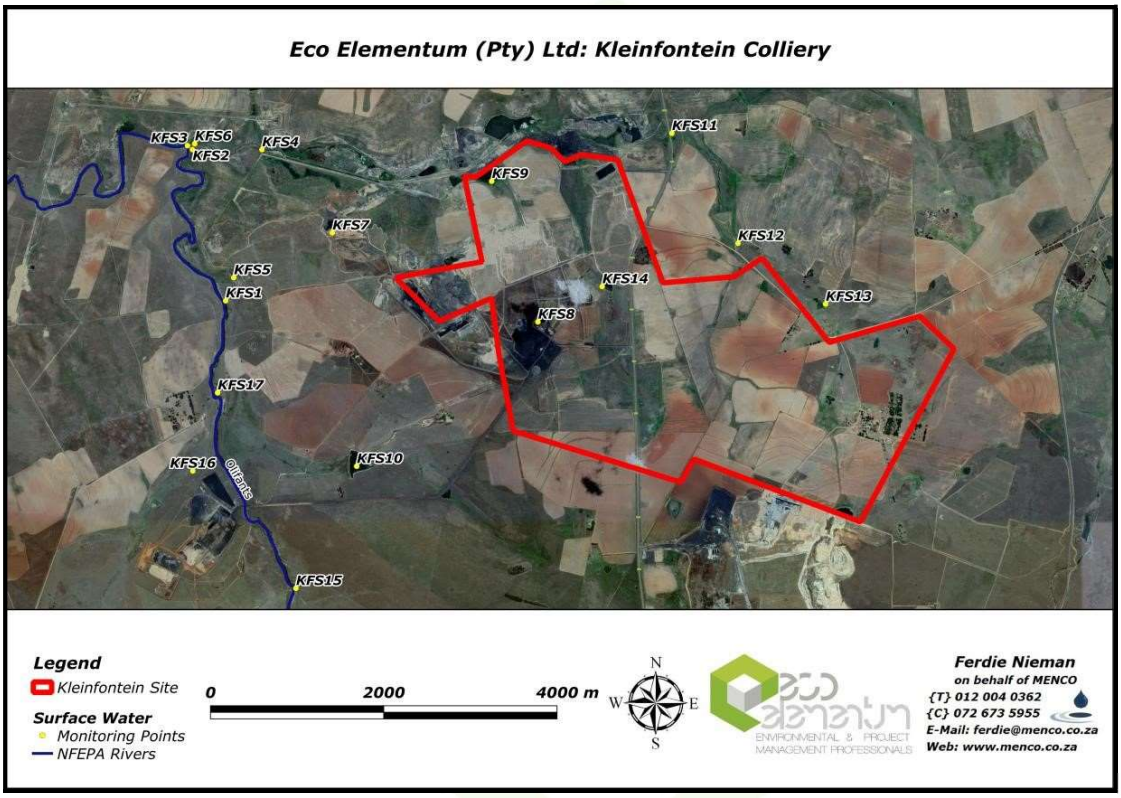


Figure 56: Surface Water Monitoring Sites

9.2.11.6 Surface Water Impacts

- Coal Mining & Related Activities in close proximity to wetlands
- Discharge of stormwater to Olifants River
- Removal of soil in wetland and riparian areas
- 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 mining infrastructure
- Construction of surface infrastructure within the 500m regulated area of a wetland
- Reduction of base flow feeding the wetland caused by a drawdown cone resulting from mining;

- Accidental spillage or discharge from pollution control facilities.
- Pollution generated from human and other general waste generated entering the surface water resources.

9.2.12 Groundwater

9.2.12.1 Aquifer Classification and Vulnerability

Based on information collected during the hydrocensus 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 Vryheid Formation is has a variable permeability and the local population is not dependent on groundwater (Geo Pollution Technology, 2018). The aquifer vulnerability was valued at 55% which relates to a "medium" vulnerability status.

9.2.12.2 Boreholes and Groundwater Level

During the hydrocensus, 14 boreholes were available for groundwater level measurement. The groundwater levels varied between a minimum of 0 m and a maximum of 15.09 m below ground level

Table 31: Groundwater Statistics at Kleinfontein

Groundwater level statistics	
Number of boreholes available	14
Number of boreholes with anomalous water levels	0
Min water level (mbgl)	0
Max water level (mbgl)	7.24
Mean water level (mbgl)	3.52

Although a groundwater monitoring network exists for the site, the drilling of additional boreholes is necessary. The recommended boreholes are listed in and the areas to site these monitoring boreholes are shown in Table 32. These boreholes can be utilised for water level monitoring during operations, as well as groundwater quality monitoring after decommissioning of the site. The potential impacts of the Kleinfontein colliery depend on the surrounding groundwater systems (i.e. groundwater levels and groundwater quality) depend on the aquifer weathering status, hydraulic aquifer parameters and hydro-chemical aquifer parameters

Table 32: Recommended Borehole Sites

ID	Latitude (South)	Longitude (East)	Borehole Depth (mbgl)	Reasoning	Frequency	Existing/New
KF-G18	-2894919	44695		Source	Biannual	Existing
KF-G23	-2895786	44199		Background	Biannual	Existing
KF-G14	-2896817	48628		Source	Biannual	Existing
KF-G12	-2896816	47439		To be mined	Biannual	Existing
KF-G6	-2895544	45881		To be mined	Biannual	Existing
KF-A1	-2895278	46034	30	Source	Biannual	New
KF-B1	-2895256	47323	30	Source	Biannual	New
KF-C1	-2895855	49418	50	Source	Biannual	New
KF-D1	-2896411	46545	30	Source	Biannual	New
KF-E1	-2896166	45938	30	Source	Biannual	New
KF-E2	-2897136	46338	30	Background	Biannual	New

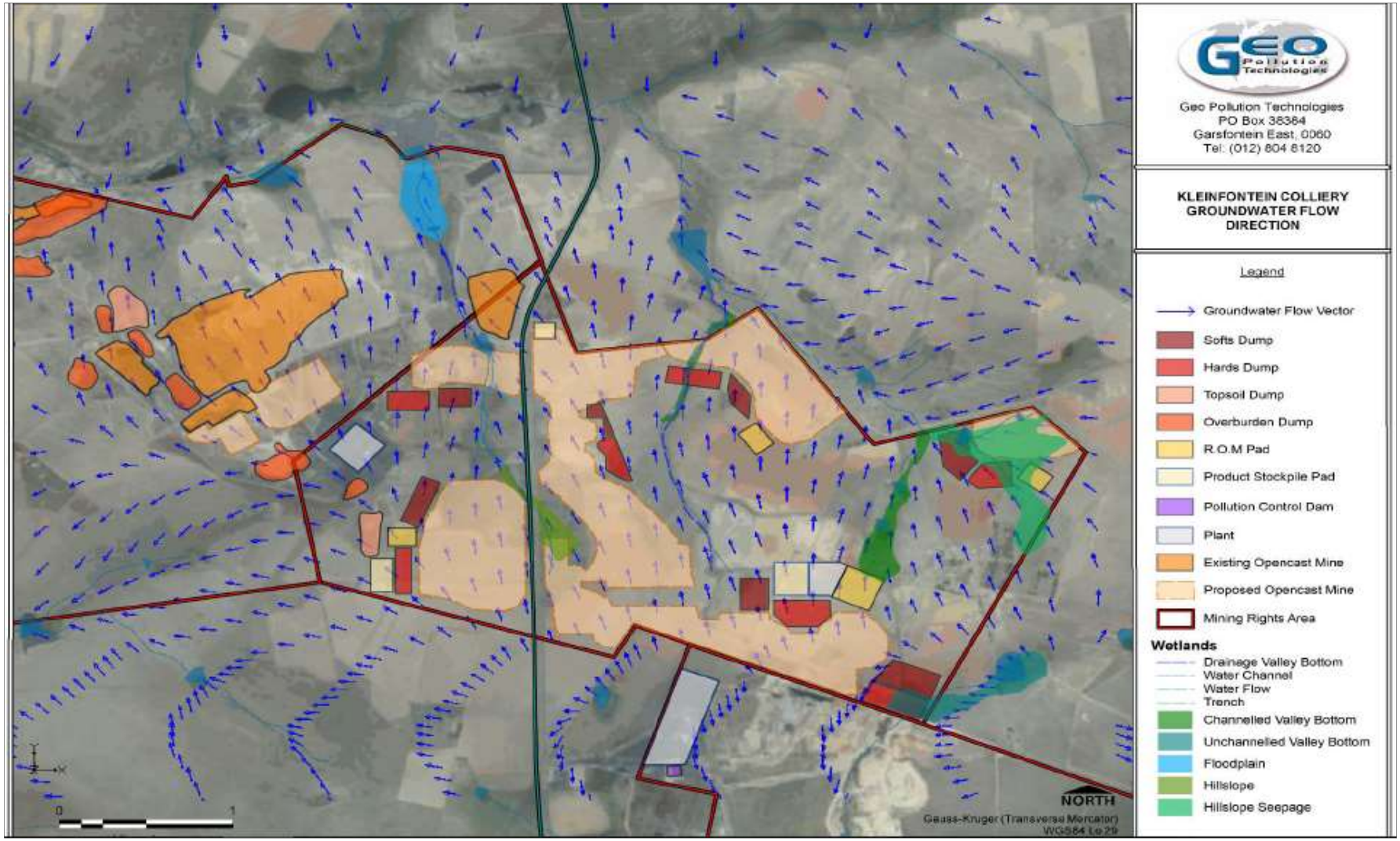


Figure 57: Groundwater Flow Direction

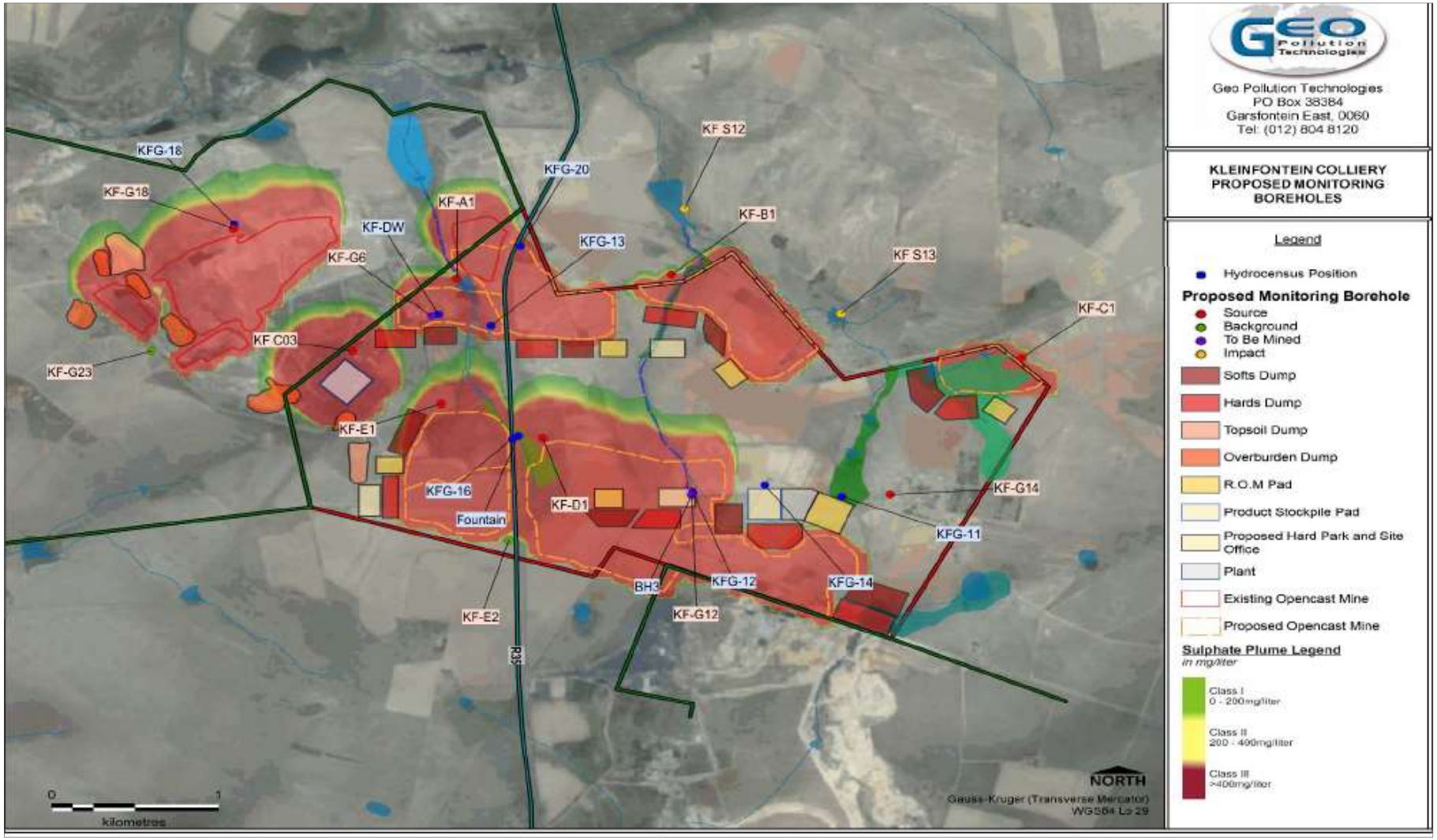


Figure 58: Proposed new Monitoring Boreholes Position

9.2.12.3 Groundwater Quality

During the Groundwater Study (GPT, 2018), water samples from 4 boreholes around the site during was analysed. Water monitoring data from January 2018 was also made available by the client. Water results were compared with the maximum recommended concentrations for domestic use as defined by the SANS 241-1: 2015 target water quality limits. The SANS 241-1: 2015 standard is applicable to all water services institutions and sets numerical limits for specific determinants to provide the minimum assurance necessary that the drinking water is deemed to present an acceptable health risk for lifetime consumption. Refer to Annexure 6 for the detailed results. A summary of the results is listed below:

- Manganese exceeds the SANS aesthetic limit in KFG18. No health effects are associated with this concentration of manganese.
- Total coliforms exceed the SANS chronic health limit in KFG12, KFG14, KFG16 and KFG18.
- Total organic carbon exceeds the SANS chronic health limit in KFG12.
- The elevated concentrations of Total coliforms and TOC may be a result of anthropogenic activity in the area.
- Turbidity exceeds the aesthetic limit in a number of samples. No health effects are associated with elevated turbidity.
- pH exceeds the SANS limit in KFS05.
- Combined nitrate and nitrite exceeds the SANS acute health limit in KFG11 and KFG13. Elevated nitrite and nitrate may be associated with agricultural activities in the area.
- Sulphate exceeds the SANS aesthetic limit in KFS04, KFS06, KFC04 and Otto Block PCD and exceeds the acute health limit in KFC03 (plant PCD). Elevated sulphate concentrations may be a result of the mining activity on site. However, only the concentrations at KFC03 are associated with health effects and this monitoring point forms part of the dirty water reticulation system on site and is not used for drinking purposes.
- Iron exceeds the SANS aesthetic limits in a number of samples.
- Manganese exceeds the SANS acute health limits in KF C03 and KF C04. Both these monitoring points form part of the dirty water reticulation system on site and are not used for drinking purposes.
- All hydrocensus points have a high proportion of Ca, Na and HCO3.
- The monitoring points at source areas (PCD's and storm water dams) generally have a higher proportion of SO4 and Ca while the remaining monitoring points have a high proportion of Ca and HCO3. The monitoring points KFS04 and KFS06 (located on the Leeuwfontein spruit) have a high proportion of SO4 and Ca.
- The monitoring point with the highest mineralisation (total dissolved solids) is KFC03 which is the plant PCD.
- the majority of monitoring and hydrocensus points have a water type associated with fresh uncontaminated water. The exceptions are KFG18 which has a water type associated with ion exchange and KFC03, KFC04, KFS06, KFS04, Otto Block PCD and Pit4 PCD which have a type of water affected by mining related contamination.

9.2.12.4 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;
  - 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;
- 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 (Table 33).
- 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. If coal and shale interburden have a significant potential to generate acid mine drainage. If left open to the atmosphere, the opencast pits will generate acidic drainage/seepage

Table 33:Summary of potential impacts post operations

Mining Area	Area (ha)	Potential impacted receptor	Estimated increase in concentrations 50 years after closure (mg/ℓ)	Rebound time (Years)	Potential decant (Yes/No)	Potential decant area
Current Opencasts	59	Borehole KF C04	900	25	Yes	To the north of the opencast
Tailings deposit	11.2	Borehole KF C04	900	-	-	-
Plant Area	194.6	Borehole KF C04	900	-	-	-
Block A	31.3	Wetland Block A	1 000	31	Yes	To the northeast of the opencast
Block A New	14.9	Wetland Block A	1 000	31	Yes	To the northeast of the opencast
Block B	37.5	Wetland Block B	1 000 - 2 000	27	Yes	To the north of the opencast
Block C	14.6	Wetland Block C	0 - 2 000	24	Yes	To the east of the opencast
Block D	122.6	Wetland Block D, Fountain	0 - 2 000	39	Yes	To the northeast of the opencast
Block E	22.3	Wetland Block E, Fountain	2 000	25	No	-
Block E New	24.4	Wetland Block E, Fountain	2 000	25	Yes	To the north of the opencast

9.2.13 Heritage and Archaeological Resources

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.

In the Heritage Study undertaken by Tobias Coetzee (2018), previous studies within the area were also consulted

- **Forzando Coal Holdings on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS**
  An archaeological survey was done for a coal mine on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS. The demarcated impact area was 600 X 600m and is located roughly 12km southeast of the Kleinfontein Colliery study area concerned in this report. Archaeological Resources Management (ARM) surveyed the study area and the remains of two circular homesteads that possibly date to the Late Iron Age were observed. Both homesteads consist of between 3 and 6 structures and are located close to a stream.

More recent angular settlement remains, as well as 2 graveyards associated with the settlements were observed. The graves consisted of mounds made with ferricrete. One of the graveyards consisted of 8 graves, and the other of 5 graves (Huffman & Steel 1995).

- **Goedehoop Coal Mine, Mpumalanga**
  An Archaeological and Cultural Historical survey and impact assessment was conducted by the National Cultural History Museum (2003) for the development of the Goedehoop opencast coalmine near Hendrina in the Mpumalanga Province. The area surveyed for the Goedehoop site is located roughly 8km southeast of the Kleinfontein Colliery study area concerned in this report. Opencast areas that were surveyed included portions of the Farms Schurvekop 227 IS, Vlakkuilen 76 IS, Middelkraal 50 IS, and Halfgewonnen 190 IS. It was noted that a few graveyards located outside of the impacted areas were observed and would therefore not be impacted. The farm Middelkraal 50 IS borders the farm Leeuwnefontein 48 IS, the farm on which the Blocks E & F are located, to the south.

- **Halfgewonnen Colliery, Mpumalanga**
  Van Vollenhoven (2013) conducted a Cultural Heritage Impact Assessment for a mining right application at the Halfgewonnen Colliery between Hendrina and Bethal. The Halfgewonnen Colliery is located on the Farm Halfgewonnen 190 IS and is located about 7km southeast of the Kleinfontein Colliery study area concerned in this report. The project entailed the extraction of pillars from the underground mining area that was previously mined through bord-and-pillar methods. Van Vollenhoven (2013) located no sites of cultural heritage significance during the survey

  The Heritage and Archaeology Report reports the following Survey/Site Names and ecommendations:

Table 34: Heritage Survey Points

Site / Survey Point Name	Longitude	Latitude	Site Dimensions (m)
K01	29.458555	-26.166719	10 X 10
K02	29.458614	-26.166104	20 X 20
K03	29.462062	-26.168733	2.5 X 2.5
K04	29.459203	-26.167880	30 X 20
K05	29.458341	-26.167426	23 X 12
K06	29.458031	-26.168044	35 X 16
KB01	29.461267	-26.177297	45 X 30

Table 35: Field Ratings and Recommendations

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
K01	Foundation	General Protection B	4 B	Medium	Record site
K02	Kraal	General Protection B	4 B	Medium	Record site
K03	Ruin	General Protection C	4 C	Low	No recording necessary
K04	Residence	General Protection B	4 B	Medium	Record site
K05	Residence	Local	3 A	High	Mitigation not advised
K06	Workshop	General Protection C	4 C	Low	No recording necessary
KB01	Graveyard	Local	3 A	High	Mitigation not advised

9.2.13.1 Graves located on site

One graveyard (KB01) on Block E, located towards the southern section of the demarcated area and next to a farm road (**Figures 26 – 31**) were observed. The graveyard consists of approximately 25 graves oriented in an east-west direction. The exact amount, however, could not be determined due dense vegetation cover and a poor level of preservation. The graveyard appears not to be in use anymore and is

not fenced-off. Burial dates are not visible on the majority of the graves; age of the graveyard could thus not be determined. The oldest date observed was 1947 and the most recent 1997. Construction material include cement, bricks and stacked stones with occasional headstones.

Dense vegetation at Graveyard KB01

Grave with headstone (KB01)

Overgrown grave in Graveyard KB01

Damaged grave in Graveyard KB01

	
Building Foundations (K01)	Kraal (K02)
	
Residence (KO4)	Residence (K05)

Photo 6: Photos of Heritage Survey

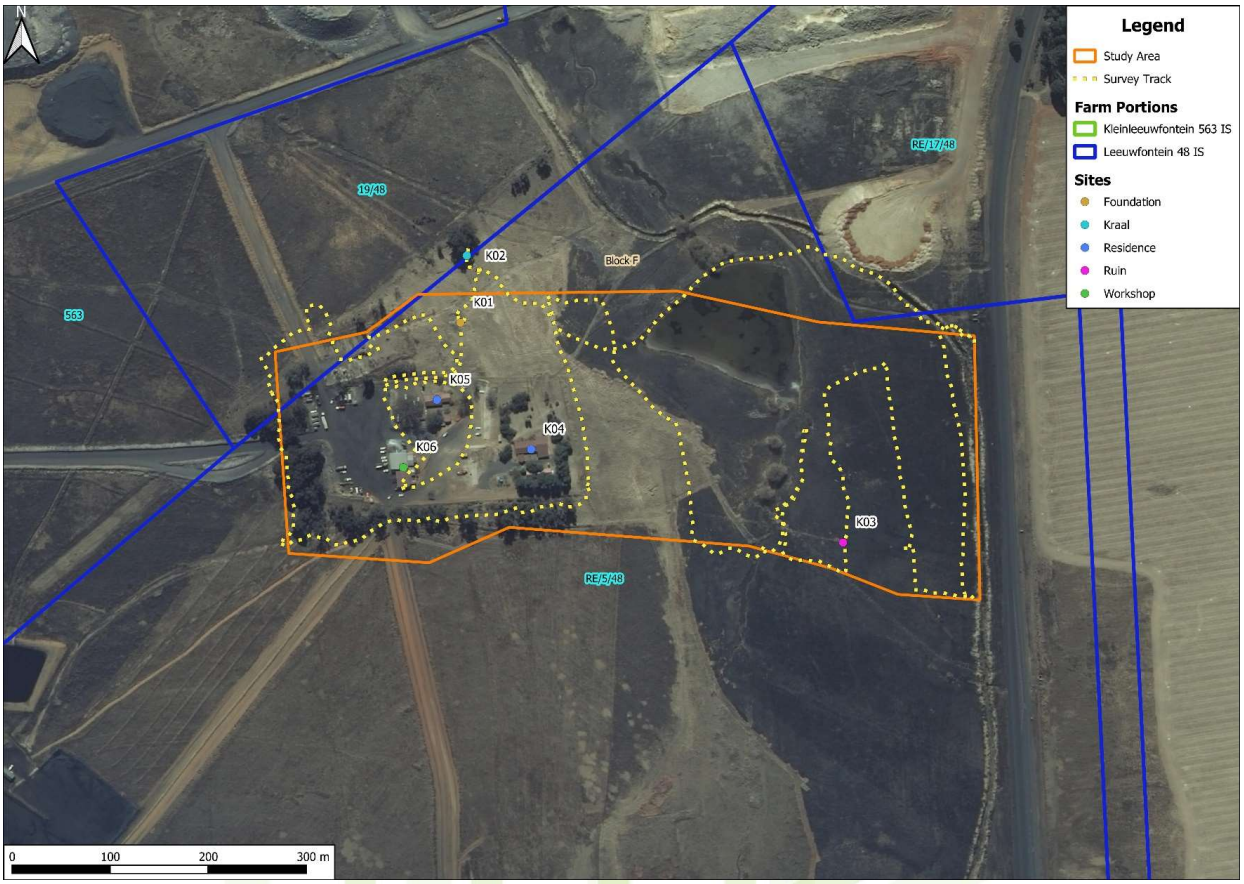


Figure 59:Study Area Block F with survey tracks

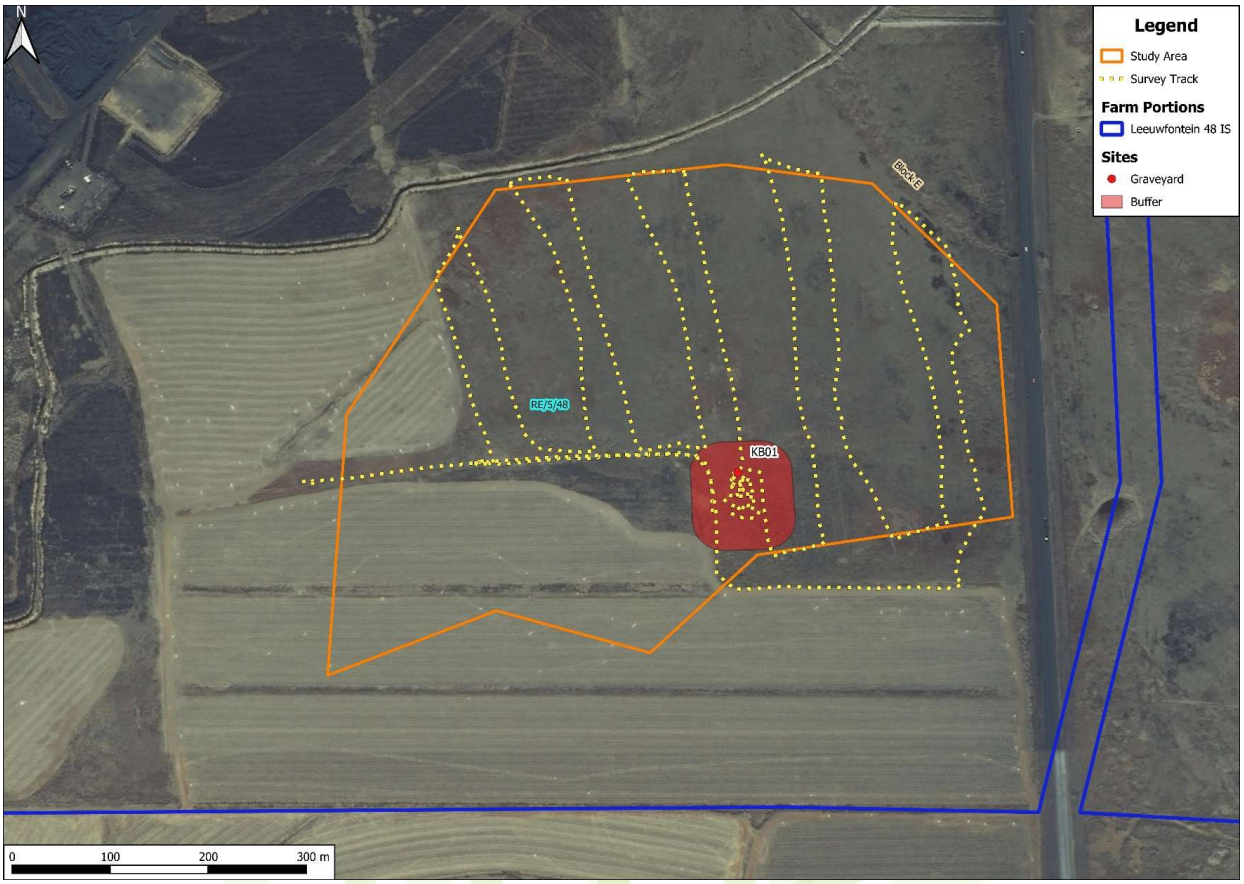


Figure 60:Study Area Block E with survey tracks

Apart from a building ruin dating to modern times, **no sites of heritage importance were observed on the eastern half of Block F**. Several sites, however, were identified on the western half. These sites include several buildings, a building foundation and a kraal. The significance of this area is that the area surrounding residence **K05 is associated with a time period exceeding 60 years and are therefore protected under the NHRA act 25 of 1999**. Although it appears that the original structure was demolished, the possibility exists that partial remains belonging to the original structure might still exist. During the following years, mining activities and modern buildings disturbed the general area, leaving little evidence of the original farmyard visible. Because the general area saw some activities dating to historical times, care must be exercised during construction phases in order to ensure the safeguarding of potential heritage resources. The only site of heritage importance observed on **Block E was the graveyard (KB01)**, which is protected by legislation.

9.2.13.2 Heritage Impacts

- All construction and operational activities of the mine throughout the LOM.
- Potentially sensitive area in Block F. Graveyard in Block E.

9.2.14 Paleontological Resources

No study was employed specifically for paleontological Resources

9.2.14.1 Regional Setting

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 (Appendix 1). This formation is early to mid-Permian (Palaeozoic) in age and consists of sandstone, shaly sandstone, grit, conglomerate, coal and shale. Coal seams are present in the Vryheid Formation within the sandstone and shale layers. Fossils are mainly present in the grey shale which is interlayered between the coal seams (Kent 1980, Visser 1989). Borehole logs in the coalfields show the following layers; soil, shale and sandstone, shale and sandstone interbedded, sandstone, coal, conglomerate reworked diamictite, Dwyka Tillite, and the Pre-Karoo Basement.

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 (SG 2.2 SAHRA APMHOB, 2012).

9.2.14.2 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.
- All construction and operational activities of the mine throughout the LOM.

9.2.15 Noise

Noise or unwanted sound is one of the most widely and frequently experienced problems of an environment surrounded by industrial activities. It can be annoying, interfere with communication, cause fatigue, and reduce work efficiency. Annoyance is in general a negative reaction of the community or person to a condition, which threatens the general wellbeing, either by creating displeasure and/ or interference with specific activities. The risk of negative reaction escalates with increasing noise levels and duration of noise exposure. It also depends on the characteristic of the offending sound (therefore referred to as noise), such as its frequency and whether it is impulsive or continuous. Over and above these mentioned above, it should be noted that some individuals are more susceptible to noise than other.

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

- The highway and supporting regional roads
- General vehicle noise on auxiliary roads in close proximity to the site
- Mining in the region and close proximity to the proposed site
- Agricultural activities resulting in noise (mostly related to farming vehicles and machinery noise although very little)
- Other industrial activities resulting in noise being generated

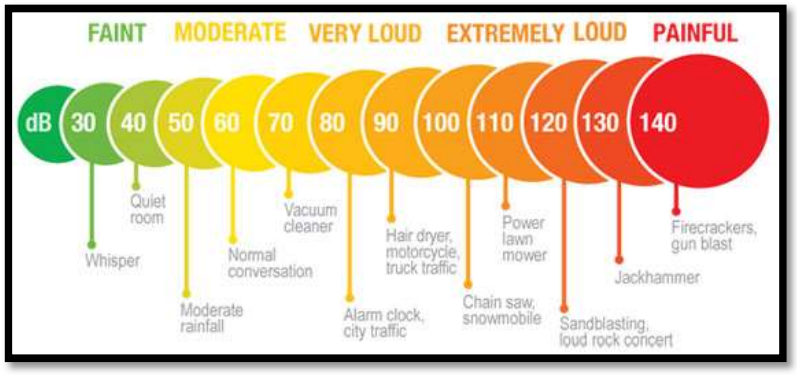


Figure 61: Noise Levels

Table 36: Results of the noise assessment

Ref	Locality	Day/Night	Acceptable rating level dB(A)	Results Leq	Time	Observations
No1	Rural agricultural	Day	70	67.5	10:23	Slight background noise audible
		Night	60	58.2	05:03	Mainly quiet
No2	Semi industrial	Day	70	74.6	10:46	Various industrial noise audible
		Night	60	62.7	05:19	Slight noise audible, mainly vehicles
No3	On proposed site	Day	70	71.6	11:15	Traffic audible, industrial and mining machinery audible
		Night	60	64.3	05:36	Birdsong and traffic audible
No4	Existing mining area	Day	70	78.9	11:35	Mining equipment background noise
		Night	60	67.2	05:50	Vehicle noise audible

Ambient sound level measurements were undertaken at various positions on the site and at surrounding offsite locations. The approach that will be used when investigating noise impacts is based on guidelines provided by SANS 10103:2008. According to the SANS 10103:2008 the sound pressure level is used as the measurement unit for noise guidelines.

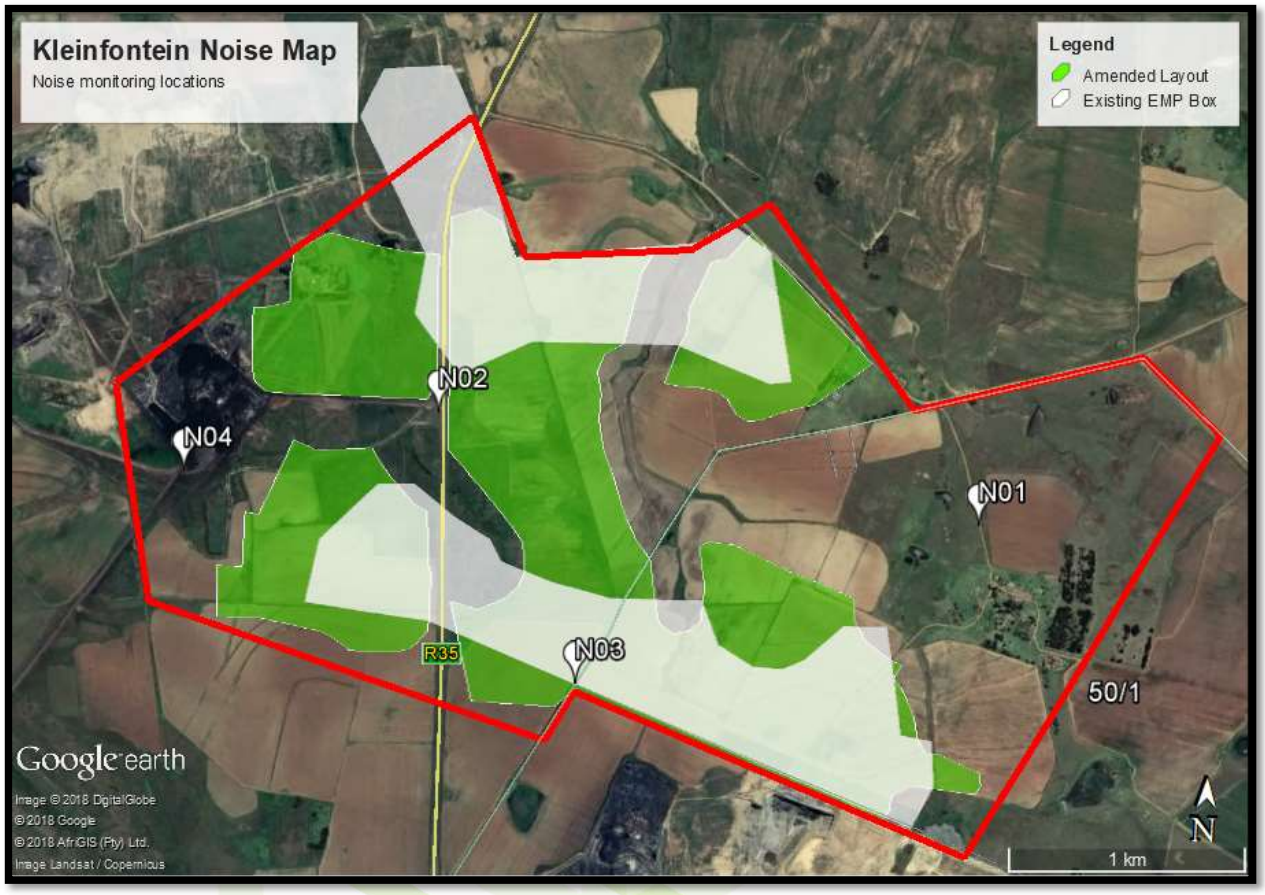


Table 37: Noise Measurement Locations

9.2.15.1 Sensitive Receptors

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

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

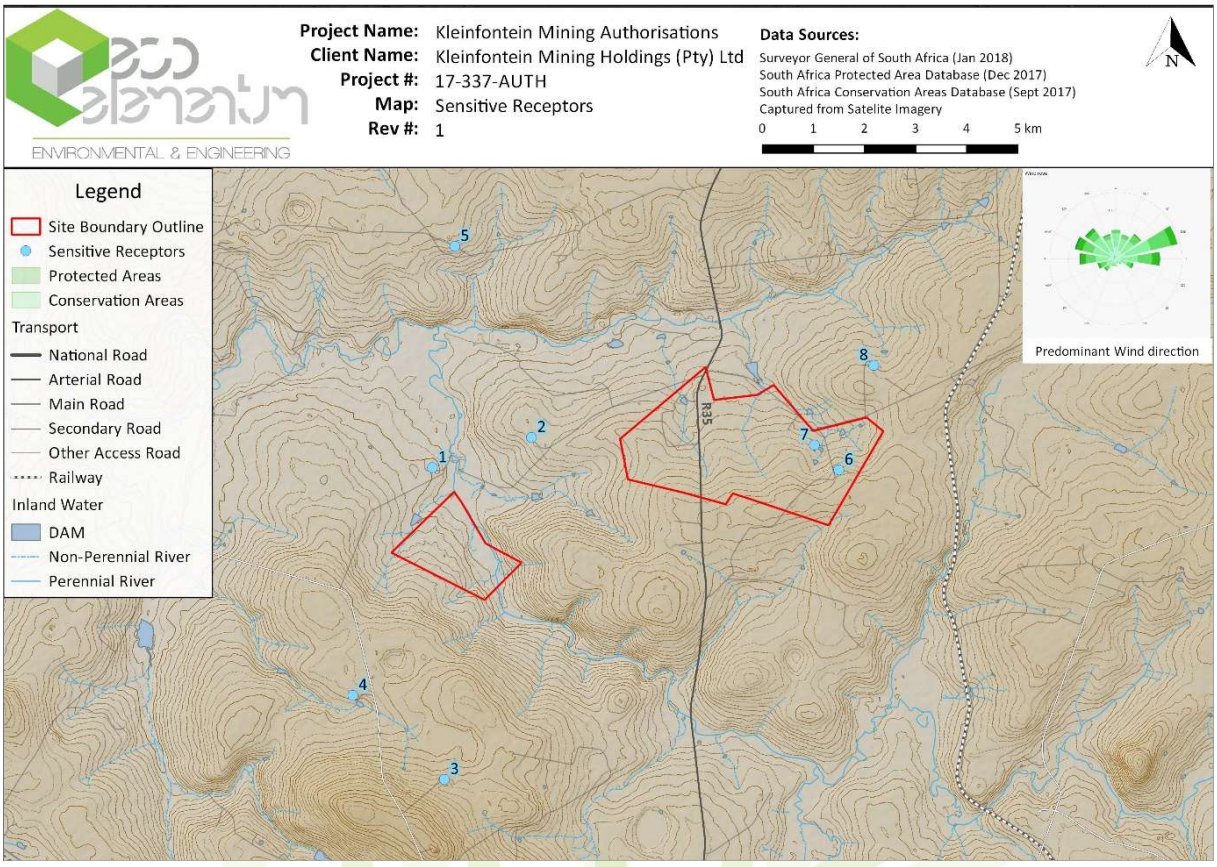


Figure 62: Location of Sensitive Receptors

Table 38: Existing Sources of Noise

Noise Source Descriptions			
Daytime	**Exposure**	**Night Time**	**Exposure**
Mining Activities	Continuous	**Mining activities**	Intermittent
Domestic animals - dogs	Intermittent	**Domestic animals - dogs**	Intermittent
Vehicle movement on main and auxiliary roads in close proximity to the study area	Continuous	**Vehicle movement on main and auxiliary roads in close proximity to the study area**	Continuous
Birdsong	Continuous	**Birdsong**	Limited to dusk and dawn
Agricultural Activities	Very limited	**Agricultural Activities**	Very limited

The ambient noise levels emitted were primarily due to the main and auxiliary roads in close proximity to the study area and existing mining/industrial activities. Almost all of the noise measurements sampling points was above the allowable limit as per SANS 10103:2008, although it only transgressed slightly during the time the measurements were taken.

9.2.15.2 Noise Impacts

The following activities are identified as possible ongoing noise sources:

- Offloading of construction materials;
- Excavations and backfilling where required;
- Blasting of coal and overburden material will increase the background noise levels.
- Concrete mixing and batching;
- Use and maintenance of roads;
- Machinery noise from construction related activities.
- Use and maintenance of haul roads (incl. transportation of material to site and offsite),
- Removal of material (mining process) and stockpiling,
- Machinery and excavation noise,
- Crushing and screening,
- Trucks clearing their load bins before loading,
- Vehicle travelling to and from site on a daily basis.

9.2.16 Blasting and Vibration

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

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

9.2.16.1 Risk Assessment

Section 17.6(a) of the Mine Health and Safety Act requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure what so ever or any surface, which it may be necessary to protect, unless a shorter distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with. A Risk Assessment is a part of the three-level risk assessment process adopted by mines in order to adhere to the requirements of section 11 of the Mine Health and Safety Act (MHSA). The tripartite risk assessment system is set out below in a flow diagram.

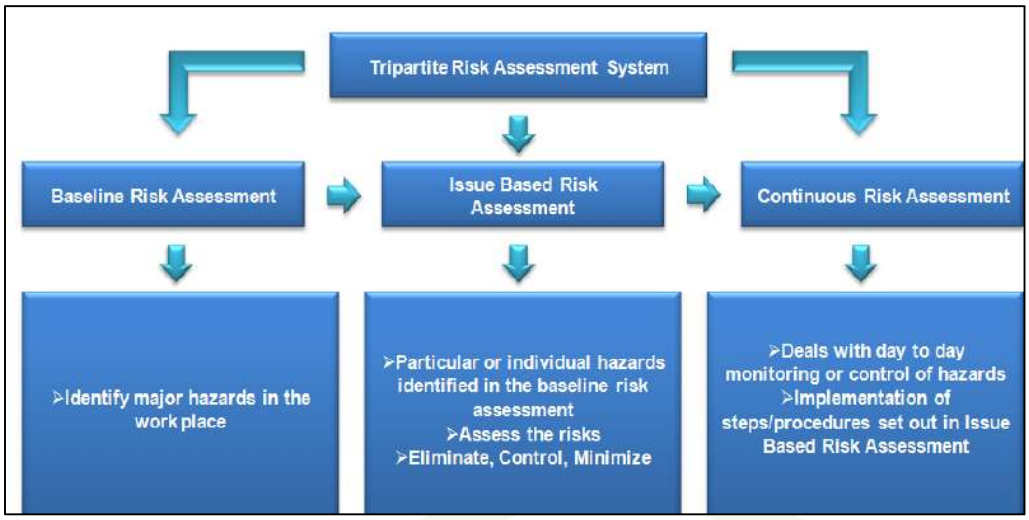


Figure 63: The tripartite risk assessment system

The risks associated with blasting have been identified and include blast and potential fly-rock. Blasting controls includes monitoring of blast design, powder factors and stemming levels to minimise the effects of air blast and ground vibrations. The new mining areas will be evacuated prior to blasting to a radius of >500m while the adjacent property owners will also be informed accordingly prior to blasting events.

A blast management plan has the following objectives of;

- Ensuring all relevant statutory requirements and company Policies and Standards are met;
- Managing and minimising the impact of blasting from mining operations on the environment and nearby residences;
- Maintaining an effective response mechanism to deal with issues and complaints; and
- Ensuring the results of blast monitoring comply with applicable criteria

Table 39: Air Blast Description

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

9.2.16.2 Noise and Vibration Impact Sources

- Blasting at the box-cut area will possible impact infrastructure in the area.
- Blasting of coal and overburden material will increase the background noise levels and vibration impacts which could impact (and damage) sensitive receptors (community and associated infrastructure), 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.

9.2.17 Transport

The existing road infrastructure is well developed in the area and thus well connected to surrounding major centres via regional routes including the R35 which connects Middelburg and Bethal.

9.2.17.1 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.

9.2.18 Visual

The project area is situated in a predominant agricultural area with dispersed homesteads in the immediate vicinity of the proposed project area. Mining activities ca also be found bordering the site boundary). The proposed Kleinfontein project will comprise of various new Open pit areas. The height of the open pit areas was at the height of the assumed berm wall, which is not higher than 10m (Figure 64).

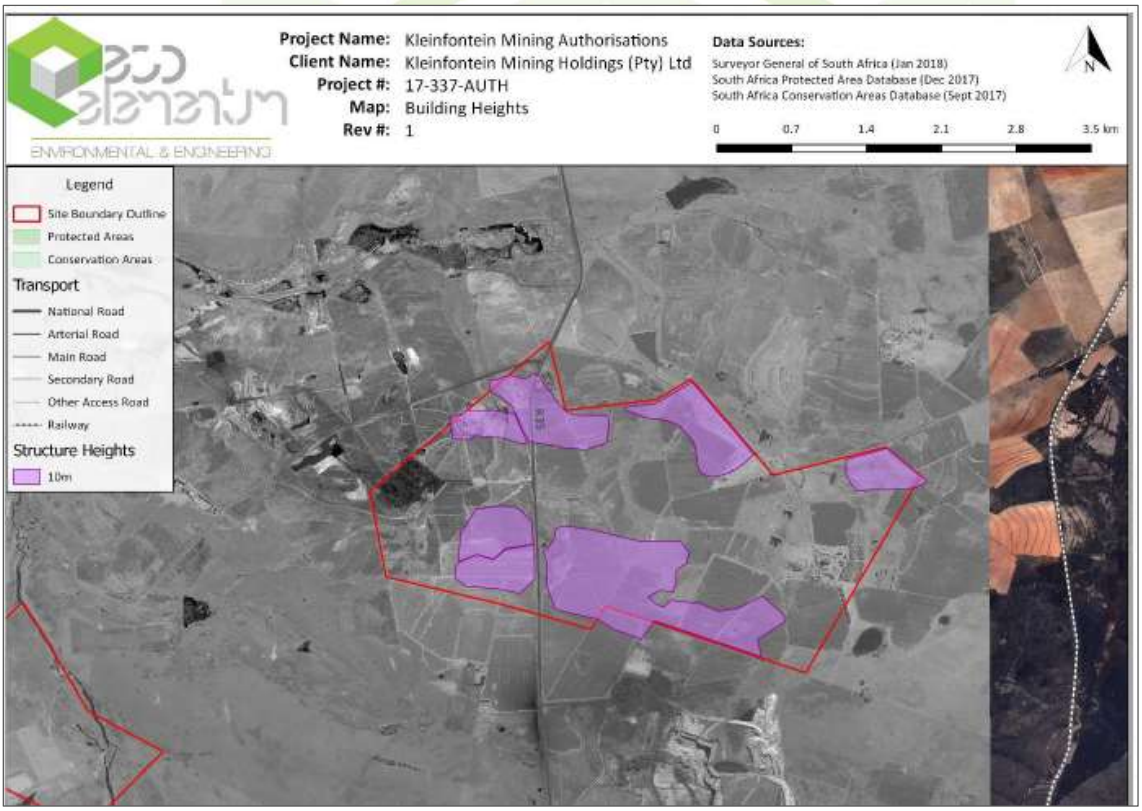


Figure 64: Infrastructure Map

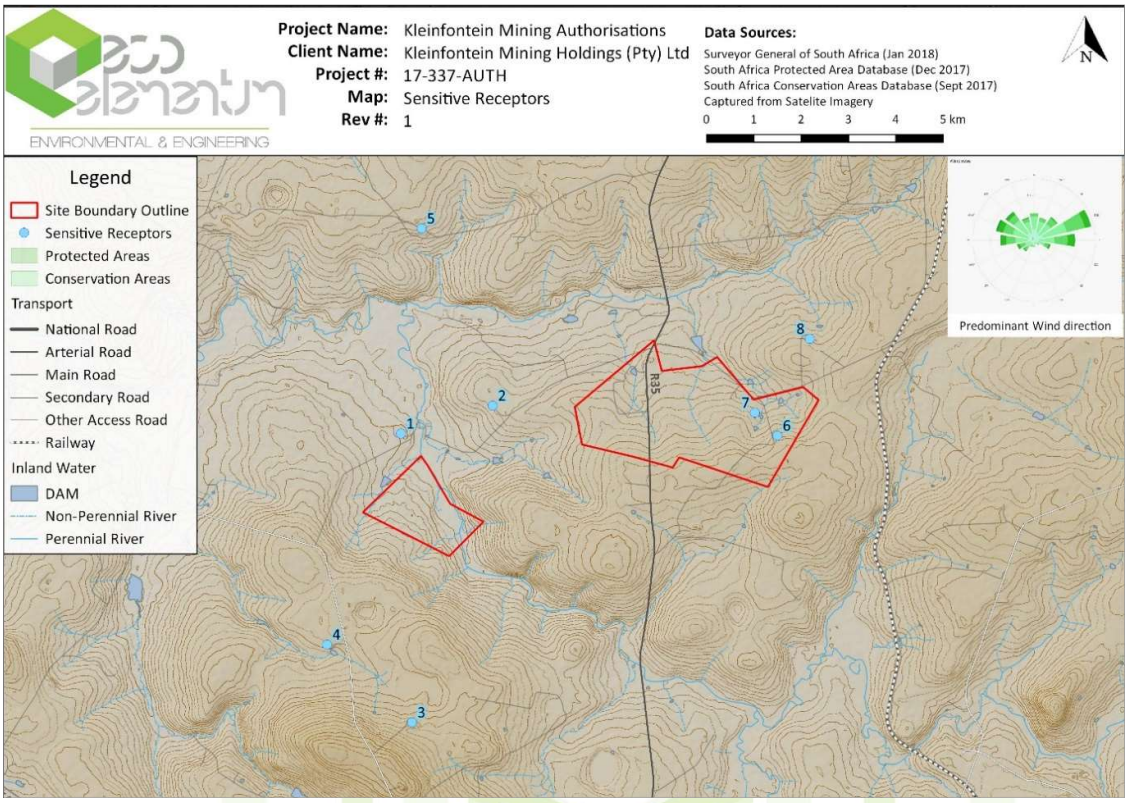


Figure 65: Location of Sensitive Receptors (Visual)

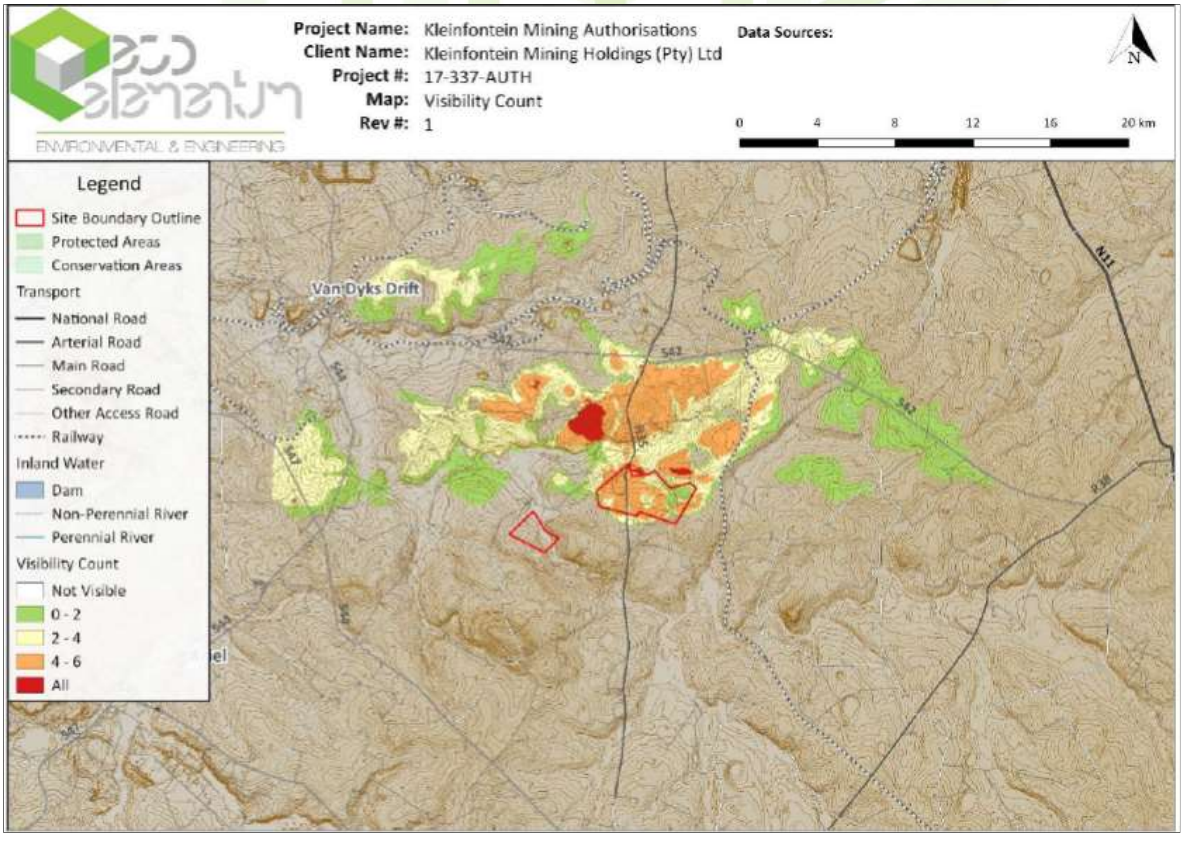


Figure 66: Visibility Count

Table 40: 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

The construction and operation phase of the proposed Kleinfontein related activities and its associated infrastructure will have a **MEDIUM** visual impact on the natural scenic resources and the topography. However, with the correct mitigation measures the impact might decrease to a point where the visual impact can be seen as less significant. The moderating factors of the visual impact of the proposed mining operations in the close range are the following:

- Number of human inhabitants located in the area;
- Natural topography and vegetation;
- Mitigation measures that will be implemented such as the establishment of barriers or screens;
- The size of the operation; and
- Medium absorption capacity of the landscape.

In light of the above-mentioned factors that reduce the impact of the facility, the visual impact is assessed as LOW visual impact after mitigation measures have been implemented.

Table 41: Visual Exposure ranking of each identified sensitive receptor

Visibility ratings		
ID	**Name**	**Rating**
2	Farmstead	3.15
5	Farmstead	1.58
6	Farmstead	6
7	Farmstead	3.12
8	Farmstead	3.33

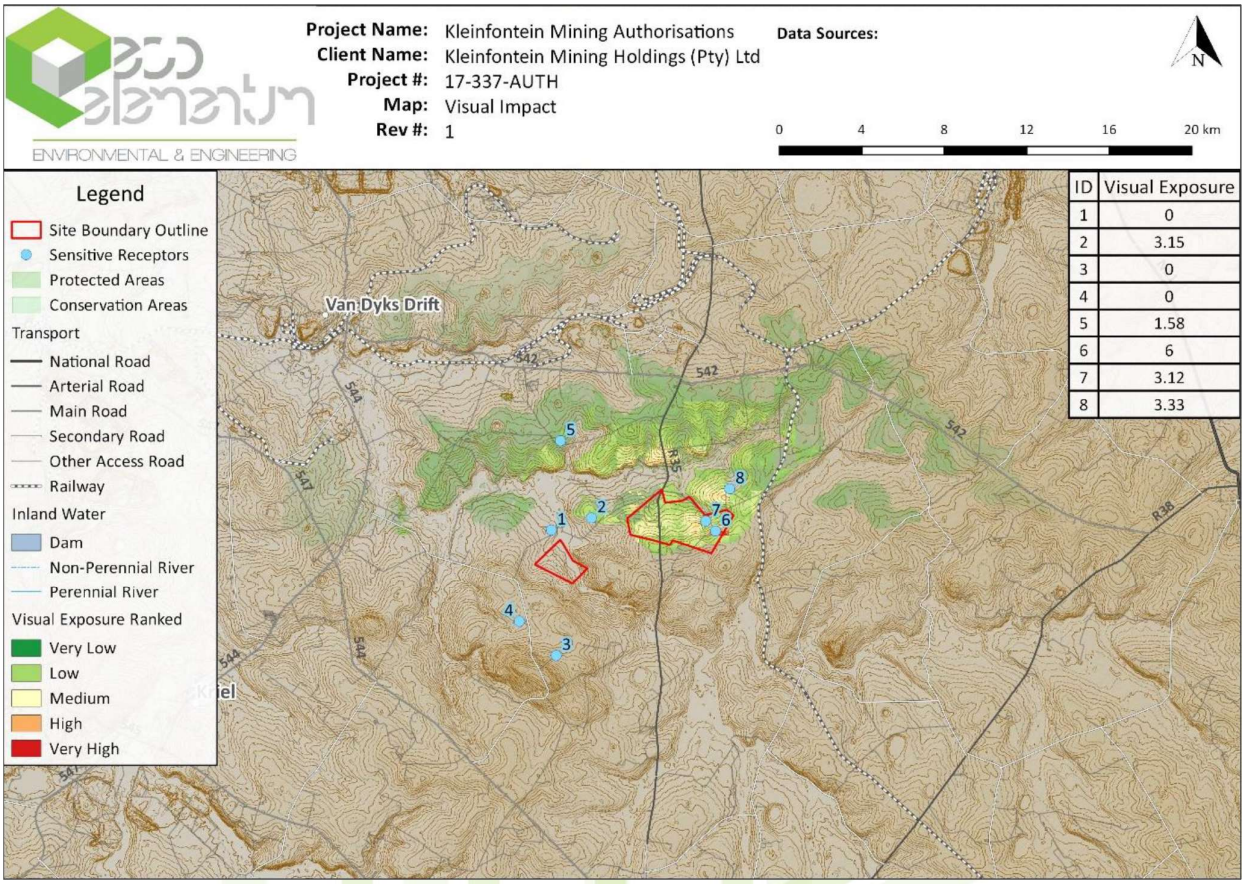


Figure 67: Viewpoint sensitive receptors overlaid on the Visual Exposure Ranking

9.2.19 Socio-Economic

9.2.19.1 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).

Statistics from the most recent census (Stats SA, 2012a) indicate that Govan Mbeki has the largest population (294,568), followed by Steve Tshwete (229829) and Msukaligwa (149378). The SIZ only forms a small portion of these areas, which is about 5.35% of the three local municipalities combined.

9.2.19.2 Population Growth

Steve Tshwete is increasingly under pressure due to population growth. In 2016, the total population in Steve Tshwete was approximately was 27 8749. Population grew by 4.4 %. Over the nine-year period from 2007 to 2016, STLM's population increased by 9.7%. The municipality is now ranked the 7th largest population in the province and 19.3% of total population of Nkangala as per the 2016 community survey.

9.2.19.3 Age and Sex Structure

A significant portion of the population growth is between 20 and 34 cohort as well as the infants (0-4 cohort). The most populous age group in 2016 were between ages 25 to 29. This could be the result of people migrating to the municipality seeking job opportunities as Steve

Tshwete. The young population group make up about 40.7% of the total population and the share of the male population in 2016 according to the CS was 52.4% and females 47.6%. The median age of Mpumalanga is 23, which is a little lower than the figure in South Africa (25). When considering those aged between 16 and 64 years of age (Economically Active Population – EAP), there are approximately 21,374 (or 64.03% of the SIZ) economically active persons within the SIZ, almost a third of the population (32.28%) is aged between 0 and 15 with a small number (3.68%) aged 65 and older.

9.2.19.4 Education Levels

According to the 2016 Community Survey, the population in Steve Tshwete aged 20+ completed grade 12, increased from 73 793 in 2011 to 97 943 (increase of 24 150) in 2016 which translate to an increase of 32.7% in the relevant period. Steve Tshwete grade 12 pass rate improved from 74.4% in 2011 to 86.3% in 2015 and became the 2nd highest of the municipal areas of the Province.

9.2.19.5 Healthcare

According to Stats SA (2012) data, the percentage of deaths in Mpumalanga that was attributed to Human immunodeficiency Virus (HIV) disease increased from 2.26% in 1997 to 3.64% in 2000, before declining to 1.88% in 2000. From 2008, the percentage of deaths increased again, peaking at 3.83% in 2009 before dropping again to 2.84% in 2010. In 2010, it is noted that Steve Tshwete had the highest level of HIV related deaths (3.94%) within the SIZ, followed by Msukaligwa with 2.27% HIV related deaths. Even though the percentage of HIV related deaths in Msukaligwa appears low, it reached above 6% during 1999 through to 2005 as is shown in Figure 4-9. Health services in these areas are placed under more pressure.

Due to the high number of power stations situated within Nkangala, the area is a pollution hotspot and has issued many Atmospheric Emissions Licenses for projects (Nkangala District Municipality, 2017). Similarly to Nkangala, Gert Sibande contains four coal fired power stations and is situated within a pollution hotspot area (Gert Sibande District Municipality, 2017).

9.2.19.6 Employment and Household Income

Mpumalanga accounted for 6% of South African manufacturing employment. The top five manufacturing industries in Mpumalanga, in terms of employment, were basic iron and steel plus metal products; chemicals and plastic; food and beverages; glass and non-metallic minerals; and clothing, textiles and footwear.

The province accounted for 9% of employment in basic iron and steel and metal products, its largest manufacturing industry. Its manufacturing was closely integrated into the Gauteng industrial sector. Coal dominated mining employment in Mpumalanga, producing mainly to supply Eskom as well as for export. Generally, gold mining saw job losses during the commodity boom, while platinum mining, coal and iron ore created employment. According to the Department of Mineral Resources (DMR) data, which is more reliable for mining, total mining employment in Mpumalanga climbed from 53 500 in 2003 to 102 000 in 2011, while sales rose from 22% of the national total to 26%. From 2011 to 2014, the number of Mpumalanga miners increased slightly to 103 000, while sales rose further, reaching 29% of the national total.

The unemployment rate of Steve Tshwete decreased slightly from 19.7% in 2011 to 16.4% in 2015 and was the lowest among all the municipal areas of Mpumalanga. Unemployment rate for females 21.8% and that of males 12.9%. Youth unemployment rate according to the 2011 Census figures 27.1% - challenge with especially very high youth unemployment rate of females **(Figure 68).**

The largest employing industries in Steve Tshwete are trade (including industries such as tourism), community/government services and mining. High labour intensity in industries such as agriculture, trade and construction. According to Census 2011, the average annual household income increased from R 55 369 per annum in 2001 to R 134 026 per annum in 2011. This represents an absolute increase in nominal terms over the 10-year period, which was the highest among the eighteen local municipalities in the province. This is closely related to its higher education levels and employment rates. According to the 2012 Statsa figures, a large percentage (8.24%) do not earn an income, with only 3.72% earning more than R 307 201 per annum (Stats SA, 2012).

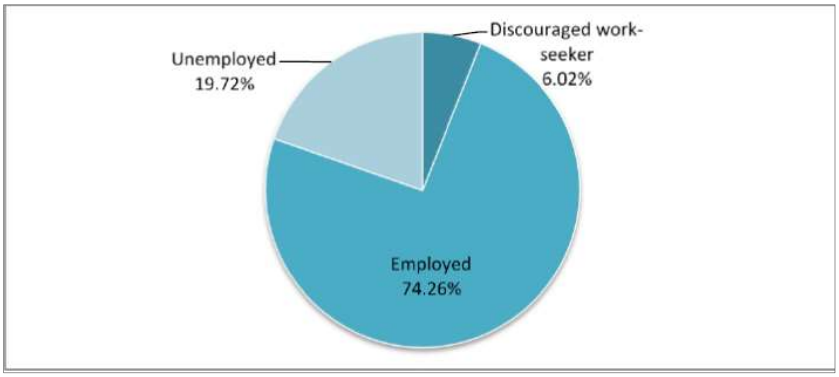


Figure 68:Employment Status (Stats SA, 2012)

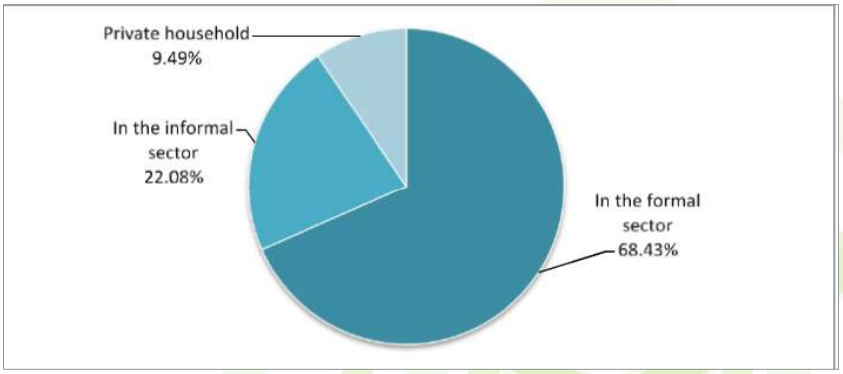


Figure 69: Employment Sector

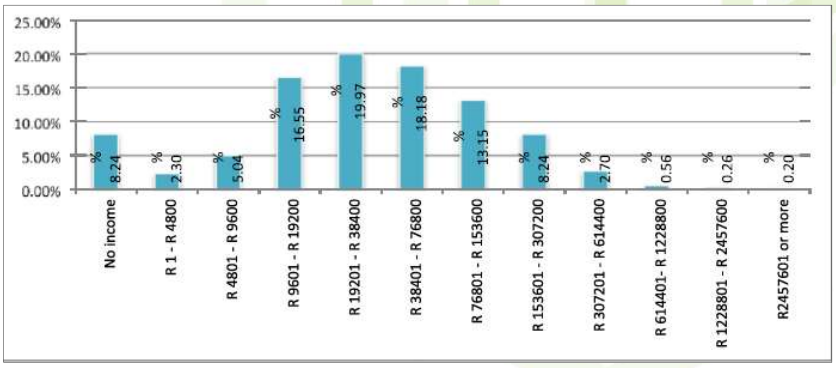


Figure 70: Individual Annual Income

9.2.19.7 Municipal Infrastructure and Service Delivery

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

Both district municipalities face problems with lack of service delivery and healthcare facilities. Nkangala faces issues of mushrooming informal settlements. With a potential influx of labourers and people moving into the district, service delivery will further decline resulting in decreased living conditions and increased health issues. In Steve Tshwete, similar issues of lack of healthcare, clinics and hospitals exist (Gert Sibande District Municipality, 2017; Nkangala District Municipality, 2017). According to Stats SA (2012), only 65.10% of the SIZ

households have access to flush toilets with 7.20% having no access to toilets at all, which is slightly higher than the rate in Mpumalanga (6.27%). A large percentage of the SIZ households (22.83%) rely on pit latrines, chemical toilets and bucket latrines.

9.2.19.8 Agriculture Sector in Mpumalanga

Between 1996 to 2012, the agricultural sector for Gert Sibande has remained fairly constant with only a 0.3% decline, while Nkangala has witnessed a slight decline in agricultural sector from 23.9% in 1996 to 22.9% in 2012 (Gert Sibande District Municipality, 2017). The agricultural sector contributes the least towards the GVA of the Nkangala (1.91%), however, the agricultural sector is an important sector as it has the potential for the development of rural areas and the country as a whole (Nkangala District Municipality, 2017).

Agricultural activity within Gert Sibande is a large sector producing products such as maize, grain, wheat, mutton, dairy, wool and sorghum and are grown mainly through dryland agriculture. The lack of training, capacity and support has resulted in Gert Sibande collaborating with various stakeholders to coordinate programmes in the development of the agricultural sector. According to the Gert Sibande District Municipality (2017), agricultural land within Gert Sibande is constantly under threat by mining activities. 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).

9.2.19.9 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 R 357 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.

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.

9.2.19.10 Mpumalanga's 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.

9.2.19.11 Socio-Economic Impacts

The following impacts are expected during all phases of the mining project:

Table 42: Negative and Positive Socio-Economic Impacts

Positive Impacts	Negative Impacts
• 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 as additional electricity is fed to the national grid • Impact on regional development (business and other); • Impact on infrastructure and resources in the region; • Impact on employment and income; and • Social upliftment due to prolonged LOM	• Change in land use (agriculture to mining) • Lost sense of place • Health and safety risks associated with mining. • Permanent presence of discard dump post-mining • Increased traffic volumes on local roads leading to increased safety issues in the vicinity of the mine. • Deterioration of the road surfaces. • Visual intrusion • Noise pollution and vibration impacts experiences by sensitive receptors • Deterioration of water resources (including wetland functionality) and the natural environment • Infringement on sensitive heritage sites

9.3 Description Of Specific Environmental Features And Infrastructure On The Site

The proposed infrastructure has been discussed under **Heading 4.3.6**. The following is a summary of the identified sensitive environmental features and other structures on the proposed site:

9.3.1 Specific Sensitive Environmental Features

Table 43: Specific Environmental Features associated with the site

SENSITIVE FEATURES	DETAILS
Wetlands and Surface Water	According to the South African National Biodiversity Institute"s (SANBI) Atlas for Freshwater Ecosystem Priority Areas (Nel, *et al* 2011), the project area is situated within the B11B quaternary catchment. Rivers and wetlands within this quaternary catchment (B11B) are considered as Freshwater Ecosystem Priority Area (FEPA). The B11B quaternary drainage area forms part of the Olifants Water Management Area (Figure 4). There are numerous wetland systems crossing the planned mining area, • Block B in drainage line and a channeled valley bottom wetland • Block C within a hillslope seepage wetland • Block D in the upper catchment of a channeled valley bottom wetland • Block E close to a channeled valley bottom wetland • Block F new situated in a drainage line

Ecological	Eastern Highveld Grassland Vegetation associated with wetland areas
Heritage	Potentially sensitive areas include Block F Graveyard in Block E.

9.3.2 Specific Infrastructure on site

9.4 Environmental Sensitivity And Current Land Use Map

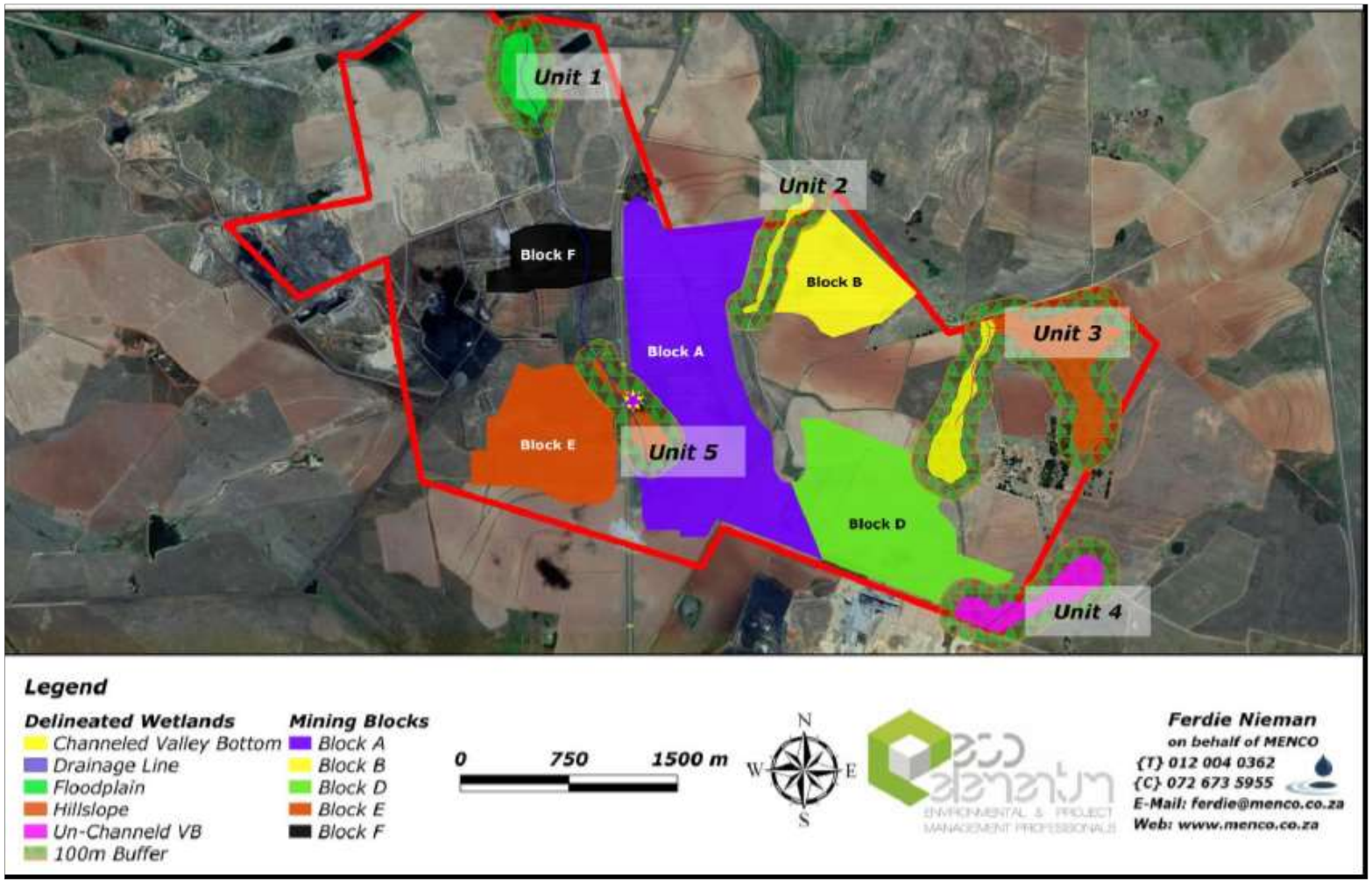


Figure 71: Site Sensitivity with recommended buffers

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

10.1 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 Appendix 8, which details the magnitude, extent, duration, reversibility, probability and the overall significance of each impact identified.

Refer to Section 9.2

10.1.1 Specific Issues raised by Interested and Affected Parties

No fatal flaws and/or objection has been received by the affected landowners and adjacent landowners. General issues related to noise and pollution of groundwater and surface water resources. One member of the public raised a concern of the gravesites (KB01) and stated that it is part of his family/community history. To this effect, the grave areas will not be impacted on by mining activities

10.2 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 44: 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.

10.2.1 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 was 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.

10.2.2 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 45: 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)EDIUM	The impact will last up to the end of the development phases, where after it will be entirely negated.	**3**

(L)ONG TERM	The impact will continue or last for the entire operational lifetime (i.e. exceed 20years) of the development, but will be mitigated by direct human action or by natural processes thereafter.	**4**
(P)ERMANENT	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact is transient.	**2**
Spatial Scale/Extent		
Classification of the physical and spatial aspect of the impact		
(F)OOTPRINT	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	**1**
(S)ITE	The impact could affect the whole, or a significant portion of the site.	**2**
(R)EGIONAL	The impact could affect the area including the neighbouring Farms, the transport routes and the adjoining towns.	**3**
(N)ATIONAL	The impact could have an effect that expands throughout the country (South Africa).	**4**
(I)NTERNATIONAL	Where the impact has international ramifications that extend beyond the boundaries of South Africa.	**5**
Probability		
This describes the likelihood of the impact actually occurring. The impact may occur for any length of time during the life cycle of the activity. The classes are rated as follows:		
(I)MPROBABLE	The possibility of the Impact occurring is none, due to the circumstances or design. The chance of this Impact occurring is zero (0%)	**1**
(P)OSSIBLE	The possibility of the Impact occurring is very low, due either to the circumstances or design. The chance of this Impact occurring is defined as 25% or less	**2**
(L)IKELY	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of Impact occurring is defined as 50%	**3**
(H)IGHLY LIKELY	It is most likely that the Impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.	**4**
(D)EFINITE	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.	**5**
Weighting Factor		
Subjective score assigned by Impact Assessor to give the relative importance of a particular environmental component based on project knowledge and previous experience. Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance		
(L)OW		**1**
LOW- MEDIUM		**2**

MEDIUM (M)	**3**
MEDIUM-HIGH	4
HIGH (H)	5

Mitigation Measures and Mitigation Efficiency

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures

Mitigation measures were recommended to enhance benefits and minimise negative impacts and address the following:

Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make "educated guesses" based on professional experience;

Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;

Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and

Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented.

The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.	**0.2**
MEDIUM-HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels	**0.4**
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw	**0.6**
LOW -MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels	**0.8**
LOW	The impact will be mitigated to the point where it is of limited importance	**1.0**

Table 46: 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 47: 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 48: 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.

10.3 Advantages And Disadvantages Of Proposed Activity

The total approved mining right area of Kleinfontein Colliery is **2968,851** hectares (ha). The total size of the properties on which Kleinfontein Colliery is located is 5 096 ha. During further invasive drilling and exploration activities on the Jicama mining area, new geological information became available which resulted in the mining layout to be altered to ensure optimal mining and utilisation of the available coal resources. This application therefore serves to seek approval for the revised mining layout (Figure 29).

1) Advantages of the S102 EMP Amendment:

- Implementation of new stormwater infrastructure (including. 5 x new Pollution Control Dam, pipes and trenches/berms) to ensure effective water management as per the National Water Act, 1998 (Regulation No. GN 77/GN 704)
- Additional open cast mining on the Kleinfontein Colliery properties – within the existing mining right area (namely seam 2 on the Jicama South Resource Block and 4U seam on Keaton 4 seam resource block situated to the west of the tar road and east of the tar road at Jicama Block 2).
- Alignment of the existing approved EMPs with the newest NEMA EIA Regulations.
    - Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM
    - Jicama MR - MP 30/5/1/2/2/318 MR
- Continued Economic stimulation and social upliftment (i.e. job retainment)
- Supply of coal to Eskom for power generation purposes and meeting of electricity demands

2) Disadvantages of the EMP Amendment and additional opencast activities on the Kleinfontein Colliery Properties

- The option of not updating the existing EMPs will translate to ineffective utilisation of approved coal mining rights at Kleinfontein including ineffective stormwater management practices on site.
- Increased and continued risk to wetland units and integrity
- Increase and continued risk for ground and surface water pollution and or degradation
- Additional air pollution due to new blocks being opened for mineral extraction, which will lead to additional dust generation
- Increased noise and vibration impacts

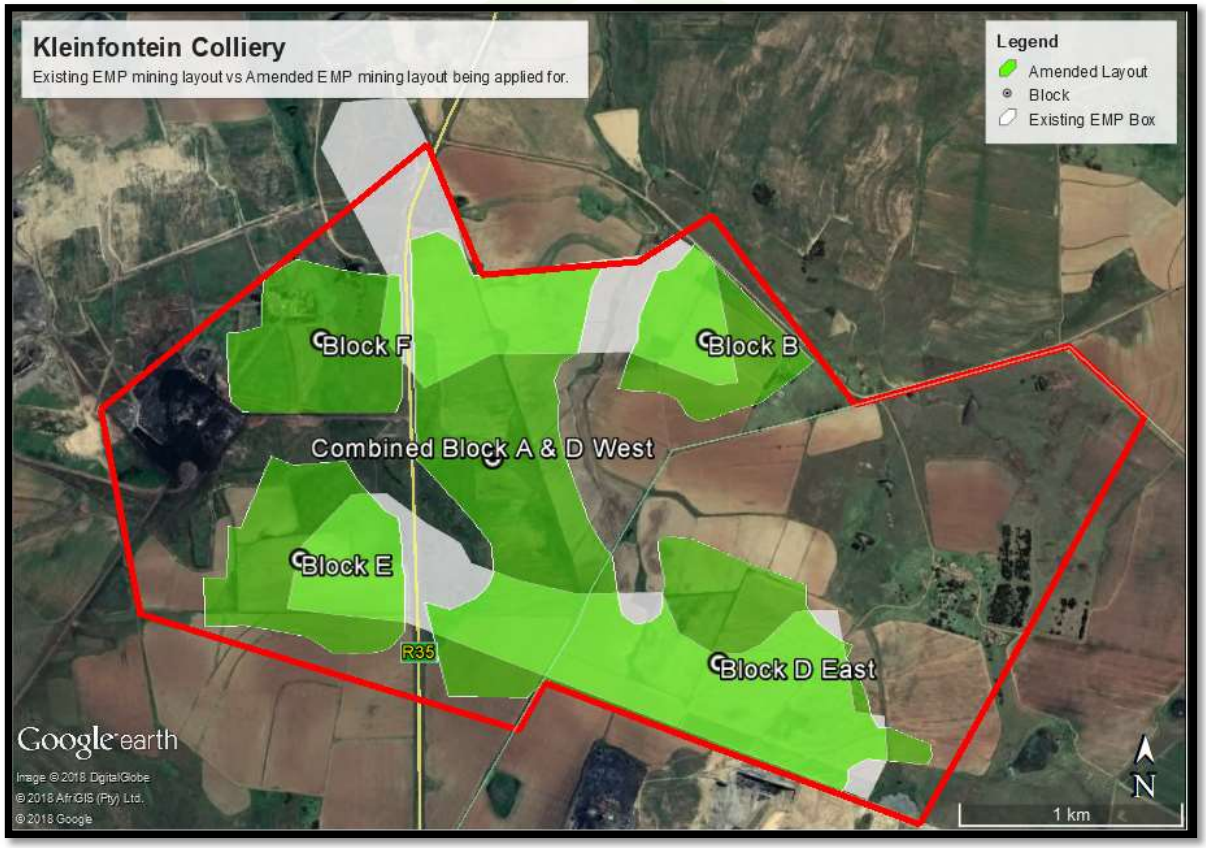


Figure 72: EMP Amendment Mining Areas

10.4 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. All mitigation measures included in the EMP have taken cognizance of any I&AP issues during the process.

10.5 Motivation Where No Alternative Sites Were Considered

The total approved mining area of Kleinfontein Colliery is 2968,851 hectares (ha). Alternative mining sites are not considered feasible for this amendment process

10.6 Statement Motivating The Alternative Development Location Within The Overall Site

N/A

10.7 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 Appendix 8, **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 **Appendix 8.**

10.8 Specialist Mitigation And Management Measures

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 49: Summary of Specific Specialist Recommendations

Specialist Study	Specialist Recommendation	Recommendation Included	Reference to Applicable Section in Report
Kleinfontein - Air Impact Assessment (Eco Elementum, 2018).	• Air Quality including dust monitoring should continue for the Life of Mine. • Should ambient dust levels exceed recommended standards and frequencies as per the Air Quality Act, then the management plan for dust will be re-evaluated and assessed to improve dust control on site. Actions could include: o Use of dust binding agents in areas of high dust generation. o Consideration of sprinkler systems in areas of high dust generation. o More frequent spraying programme.	YES	See Refer to EMP Management Tables (Part B of this report)
Visual Impact Assessment (Eco Elementum, 2018)	• 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 will include final rehabilitation, after care and maintenance of the vegetation and to ensure that the final landform is maintained. • Plant indigenous trees to create a barrier between the neighbours and roads; • Dust from stockpile areas, roads and other activities must be managed by means of dust suppression to prevent excessive dust; • A wind barrier system that encloses the stockpiles and tailing dumps; • Stockpiles and waste rock dumps should not exceed 20 m in height; and • On-going rehabilitation of the area must be done as mining continues as per the current plan	YES	Refer to EMP Management Tables (Part B of this report)
EMP Review Audits (2015) **Umcebo Mining Environmental Authorisations Compliance Audit 2015 – Kleinfontein Colliery. Project A0564. Report No. JKC_0464.**	• Minimise the surface disturbance footprint new mining blocks. • 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. • Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.	YES	Refer to EMP Management Tables (Part B of this report)

	• To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum. • Ensure all topsoil stockpiles are clearly and permanently demarcated and located in defined no-go areas. • 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. • Use appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reduce slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Use drainage control measures and culverts to manage the natural flow of surface runoff. • Existing established roads should be used wherever possible. No carbonaceous material must be used to construct access roads • 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. • 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; • Avoid waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste containing potentially contaminating fluids and other wastes; • Cleaning up areas of spillage of potentially contaminating liquids and solids. • 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. • Stockpiles should be managed so they do not become contaminated and then need additional handling or disposal; • A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; • Processing areas should be contained and systems designed to effectively manage and dispose of contained storm water, effluent and solids; • Storage tanks of fuels, oils or other chemicals 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 wash down 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. • 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 • Strip maximum amount of topsoil and place directly. Replace at least 600 mm of topsoil. • A soil specialist should be appointed to conduct post- rehabilitation survey which includes o Assessment of the land form of the rehabilitated site; o Soil depth o Compaction, soil/spoil interface disturbance and rooting of vegetation. o Soil samples for chemical analyses. o Soil loss. o Land use capability post-mining with regard to slope, soil type and soil depth.		
Updated Groundwater impact study (Geo Pollution Technologies,2018)	• Along with normal best practice guidelines the mine should consider the following: o Placement of stockpiles, discard dumps etc outside the 100 m buffers o 100 m buffer from the edge of the Block B wetland system o 100 m buffer from the Block E wetland o 100 m buffer from the new Block F wetland o 100 m buffer from the Block E/D wetland o Reconsideration of mining Block C • By applying the above 100m buffer the wetland flow drivers could be lowered as follows (see Figure 20): o Block B Channelled valley bottom wetland – 45.5 % to less than 15% loss of flow drivers o Block C Channelled valley bottom wetland – 10.9 % loss to 0 % loss of flow drivers o Block C Hillslope seepage wetland – 2.2 % loss to 2.2 % loss of flow drivers o Block E/D Channelled valley bottom wetland – 28.7% to less than 9% loss of flow drivers o If mining considers mining out wetlands or to within 32 m buffers it recommended that further soil surveys and well as shallow piezometers be drilled between the proposed opencasts and the wetlands. Wetland offsets strategy could also be investigated o Update the numerical and geochemical model against monitored data during operations every two years o Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations and as feedback to stakeholders in the catchment, perhaps via the CMA (Catchment Management Agency).	YES	Refer to EMP Management Tables (Part B of this report)

	○ The monitoring as recommended in the report should be established prior to operation (including new monitoring points). ○ The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts		
Kleinfontein Aquatic Ecological Study (Menco, 2018) ***Report Ref 201804/KC/Wet/V1***	• It is recommended that bio-monitoring be done on a bi-annual basis to ensure more accurate results for season variability between dry and wet season conditions. As the Leeuwfonteinspruit was fairly dry at the time of sampling the dry season conditions might produce fairly different results. Surface water should also be monitored on a bi-annual basis to successfully relate the change in habitat conditions to that of the water quality. • It is important to establish a database which contains the monitoring and bio-monitoring data from the current and future assessments. These will allow tracking any sudden or gradual changes in habitat conditions or water quality. This would help in identifying any potential external sources impacting the water quality and habitat conditions as well as direct impacts from the mine. The data basis will assist in providing long term trends in changes in environmental conditions. • The water quality results produced several non-compliant results when being compared to the WUL. It is thus important that Kleinfontein Colliery ensure that the water quality associated with the Colliery is compliant to the WUL. • Due to external influences potentially having a noticeable influence on the water quality and River morphology it is important to take appropriate actions to ensure that the receiving environment is improved. This can be done by ensuring that important wetland systems and River systems in the upper catchments are more widely protected and rehabilitated. It is also important to identify potential sources of pollution at an early stage after which water quality standards could be enforced. It is then also important to ensure that external sources maintain a high standard of water quality objectives. • It is also important to restore and rehabilitate channel morphology and riparian vegetation should any disturbances occur. It is very important to stabilise bank • erosion as this has had a particularly clear effect on the Leeuwfonteinspruit upstream and downstream sites. • The short-term objective for Kleinfontein Colliery would be to ensure that the current system does not degrade any further and that the health class remain with a Category C, while the long term objective is to implement appropriate actions above to ensure that the PES is controlled and maintained in a Health Class C which is also the recommended state for the river systems.	YES	Refer to EMP Management Tables (Part B of this report)

Surface Water Impact Assessment (Menco,2018) 201805/ECOE/KC_SUR/V1	• It is recommended that the mine investigate treatment options if the generation of AMD on site becomes evident as decanting into the Leeuwfonteinspruit will result in water quality deterioration. • The mine must implement a zero discharge policy and comply with GN 704 (or the latest) regulations in construction of storm water management infrastructure. • A comprehensive long term (at least 5 years) Integrated Monitoring and Environmental Management Plan (EMP) including aquatic and terrestrial ecosystems be devised. This should include a plan regarding the maintaining and rehabilitation of wetland areas impacted by the new mining activities. • Alternatives are considered for the effective recycling of an achievable amount of waste water. • The rehabilitation of disturbed mining areas to be free draining and re-vegetated to ensure clean run-off without the risk of erosion and siltation problems. With regards to future bio-monitoring the following recommendations are made: • A Fish Response Assessment would be a better indication to the toxic effects of the discharge. • Diatom sampling be conducted together with the Fish Response Assessment • Toxicity tests be conducted which should include bio-accumulation assessments in aquatic invertebrates located in the Leeuwfonteinspruit and Olifants River	YES	Refer to EMP Management Tables (Part B of this report)
Kleinfontein Wetland Delineation (Menco, 2018) Report REF201805/ECOE/KC_WET/V1	• In terms of Section 40 of the National Water Act, 1998 (Act No. 36 of 1998), a WULA and Environmental Risk Assessment (ERA) must be submitted for all activities within 500 m of a wetland. • A minimum of 100 m buffer zone be maintained around the wetland areas wherein no surface mining or related activities are allowed to take place in order to protect the integrity of the wetland as these wetlands still remain an important wetland system in the region with a modified condition and high ecological importance and sensitivity class. • This 100M buffer zone should be clearly demarcated as a “NO GO” area to prevent any accidental entrance into the area. Cognisance is taken of the fact that final access road is simply the upgrading of an existing road and will be within close proximity to the railway line.This will have an insignificant impact on the wetland system especially if careful planning is considered for the construction of the crossing. • Undermining at Block E can be considered pending the outcome of the Geotechnical Assessment. • Any activities that may potentially result in significant adverse effect on the in wetland should be avoided at all costs.	YES	Refer to EMP Management Tables (Part B of this report)

	• Storm-water management practices must be applied and incorporated into management with the aid of a suitably qualified engineer to avoid disposal or spillage of any environmentally harmful materials or waste into the wetland. • Should the mitigation measures fail to adequately protect the integrity of the wetland habitat, compensatory measures in terms of a Wetland Offset Strategy needs to be investigated, motivated and presented to the Regulatory Authority. • Should the mine development in future needs to transgress the wetland areas, a water use license authorisation in terms of section 39 or 40 of the National Water Act, 1998 (Act No. 36 of 1998) for the Section 21(c) and (i) uses must be applied for. • A 100m buffer must be maintained at all time with the exception of the access road construction. • A Wetland Rehab & Maintenance Plan needs to be drafted and implemented to ensure that there is no degradation of Wetland Functionality. • An Alien Invasive Control Program must be drafted and implemented before additional opencast activities commence		
Kleinfontein Ecological Assessment Report (Eco Elementum, 2018)	• Ecological buffers proposed (100 m from the wetland areas should be adhered to and be excluded from the mining footprint). • 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. • 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.	YES	Refer to EMP Management Tables (Part B of this report)

	• Rehabilitation should take place concurrently with the prospecting and mining activities. Close monitoring of plant communities should be done to ensure that ecological balance is restored and the environment is self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary. A report should be written and stored to be made available and should be available at all times.		
Phase 1 Archaeological Impact Assessment For The Expansion Of The Kleinfontein Colliery Between Hendrina And Bethal, Mpumalanga (Tobias Coetzee, 2018) AIA-1604181	• Avoid potentially sensitive area and graveyard during construction and operational phases. • Ensure identified site K05 and Graveyard KB01 are not impacted • Sites K03, K04 and K06 are of recent origin and are therefore not important from a heritage perspective. No further action is therefore required. • Site K02 falls outside of the development footprint and will therefore not be impacted by the proposed development. However, should the proposed development affect this site, it is recommended that the kraal be recorded prior to destruction. • The recording of building foundation K01 during the survey is regarded as sufficient. Therefore, no further action is required. • Although disturbed, the area surrounding K05 dates to historical times. Therefore it is recommended that site K05 not be impacted by the proposed development. Monitoring should be done by an ECO to determine the level of impact caused by the proposed development. Should an impact be observed as a result of the proposed development, a qualified archaeologist must be contacted to provide further recommendations. Alternatively, should the destruction of the site be inevitable, a qualified archaeologist must recorded the site and a destruction permit must be obtained from the South African Heritage Resources Agency. • Because Graveyard KB01 is no longer in use, it is recommended that a fenced-off conservation buffer of 30m be established around the graveyard and that the graveyard be kept tidy. Access to the graveyard must not be refused and the mine ECO should regularly inspect the fence, as well as the graves. Should any additional damage be observed as a result of mining activities, a qualified archaeologist must be contacted to assess the situation to provide further recommendations. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried in the concerned graveyard. • 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	YES	Refer to EMP Management Tables (Part B of this report)

	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. • From a heritage point of view, development may proceed on the demarcated portions, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.		
Noise Assessment (Eco Elementum, 2018)	• Noise monitoring is to be conducted on a quarterly basis throughout the life of the operation to determine the impact of the noise levels on the relevant noise sensitive receivers as well as determine the level of mitigation. Should the noise levels exceed the standards more stringent monitoring will be required in order to guide the management and mitigation measures to be implemented. • The noise measurements should be taken as per the ambient noise measurement locations of this report although additional noise monitoring points should be identified should other sensitive receptors become known during the life of the operation. • A report must be compiled quarterly and submitted to management to ascertain compliance with the required standards (if required monthly). • Management should be advised of any significant increase in the ambient sound level as operations continue. At each measurement point the ambient noise level will be sampled in terms of the following parameters: o The A-weighted equivalent sound pressures level (LAeq) for duration not less than 10 minutes per monitoring point. o Measurements to be taken during both during the daytime (06:00 to 22:00) and the night time (22:00 to 06:00).		
Sociol Impact Assessment Report (Eco Elementum, 2018)	• 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 councillors (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.	YES	Refer to EMP Management Tables (Part B of this report)

	• 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. • Retain as much construction 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 of the Social Labour Plan and monitor progress annually (performance review). • Adhere to all existing lease agreement with landowners • Adhere to the Relocation Plans that has been signed with affected parties		
Kleinfontein Final rehabilitation, decommissioning and mine closure plan (Eco Elementum, 2018)	• The following closure criteria is relevant to the Mine 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.	YES	Refer to EMP Management Tables (Part B of this report)

	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 ○ 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; ○ 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.		

11. ENVIRONMENTAL IMPACT STATEMENT

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

Refer to Annexure 8 for the detailed Impact Assessment Tables

11.2 Final Site Map

Refer to Annexure 3 and 4 for final site layout (overlain with the sensitivity layer).

11.3 Summary Of Risks Of The Proposed Activity And Identified Alternatives

Refer to Annexure 8 for the detailed risk assessment

12. 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.

13. FINAL PROPOSED ALTERNATIVES

The total approved mining right area of Kleinfontein Colliery is **2968,851** hectares (ha). The total size of the properties on which Kleinfontein Colliery is located is 5 096 ha. During further invasive drilling and exploration activities on the Jicama mining area, new geological information became available which resulted in the mining layout to be altered to ensure optimal mining and utilisation of the available coal resources. This application therefore serves to seek approval for the revised mining layout (Figure 29).

1) Advantages of the S102 EMP Amendment:

- Implementation of new stormwater infrastructure (including. 5 x new Pollution Control Dam, pipes and trenches/berms) to ensure effective water management as per the National Water Act, 1998 (Regulation No. GN 77/GN 704)
- Additional open cast mining on the Kleinfontein Colliery properties – within the existing mining right area (namely seam 2 on the Jicama South Resource Block and 4U seam on Keaton 4 seam resource block situated to the west of the tar road and east of the tar road at Jicama Block 2).
- Alignment of the existing approved EMPs with the newest NEMA EIA Regulations.
    - Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM
    - Jicama MR - MP 30/5/1/2/2/318 MR
- Continued Economic stimulation and social upliftment (i.e. job retainment)
- Supply of coal to Eskom for power generation purposes and meeting of electricity demands

2) Disadvantages of the EMP Amendment and additional opencast activities on the Kleinfontein Colliery Properties

- The option of not updating the existing EMPs will translate to ineffective utilisation of approved coal mining rights at Kleinfontein including ineffective stormwater management practices on site.
- Increased and continued risk to wetland units and integrity
- Increase and continued risk for ground and surface water pollution and or degradation
- Additional air pollution due to new blocks being opened for mineral extraction, which will lead to additional dust generation
- Increased noise and vibration impacts

14. ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

- The inclusion of the 100 m buffer zone required around wetland areas (Wetland Units 1-5)
    - **Wetland 1** is a floodplain wetland system situated at the confluence with the Olifants River and Leeuwspruit. The system is linked with a Channelled Valley Bottom which is fed by a fountain as part of a hill slope situated at the eastern border of Block E New. This wetland will be described in the report as wetland 5.
    - **Wetland 2** is a channelled Valley Bottom which is intersected by Block B. Infrastructure such as the Softs and Hard Dumps will be placed within the protective buffer zone.
    - **Wetland 3** is delineated as a hill slope seepage with the potential to be impacted by Block C mining activities inclusive of the ROM stock pile as well as the Softs and Hards Dumps.
    - **Wetland 4** is delineated as an un-channelled Valley bottom. Mining infrastructure associated with Block D impact on the hill slope linked with the un-channelled Valley Bottom system
- Mining footprint must be kept to a minimum.
- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site (infrastructure within 500m of a wetland)
- The Stormwater Management Plan (2018) as compiled by Eco Elementum Engineering (Pty) Ltd must be incorporated prior to additional opencast activities commencing.
- Air Quality including dust monitoring should continue for the Life of Mine

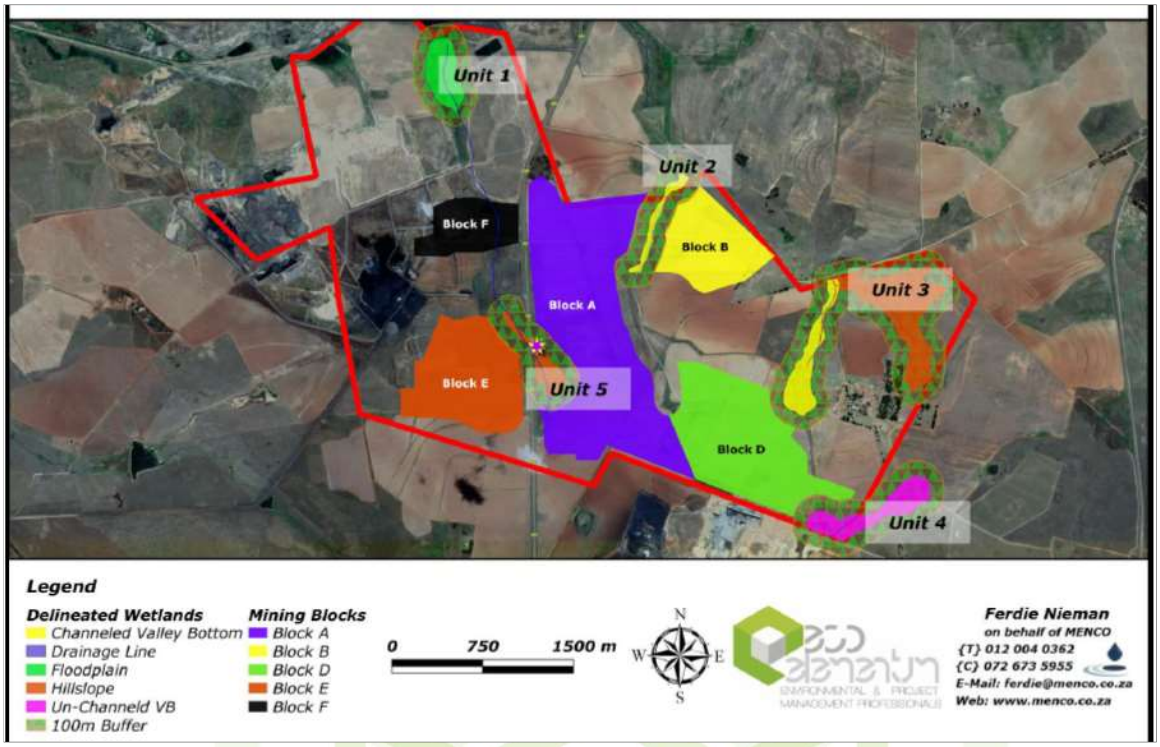


Figure 73: Final Layout with 100m buffer zones

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

Refer to Annexure 6 for the specialist studies and their respective assumption, uncertainties and gaps in knowledge.

15.1 VISUAL IMPACT ASSESSMENT

- The core study area can be defined as an area with a radius of not more than 15km from the structures. This is because the visual impact of structures beyond a distance of 15 km would be so reduced that it can be considered negligible even if there is direct line of sight.
- It is assumed that there are no alternative locations for the structures and that the visual assessment, therefore, assessed only the proposed site.
- The height of the VIA is based on the heights as stipulated in the report.
- The assessment was undertaken during the planning stage of the project and is based on the information available at that time.
- Only the new infrastructure is discussed in this report, as this is an existing operation.

15.2 WETLAND IMPACT ASSESSMENT

The wetland assessment (Menco, 2018) only outlines wetlands directly related to the potential impact area and does not include wetlands outside the scope of work;

- Many other wetlands (wetland cluster) are found within the drainage of the Olifants River and its tributaries and are not included in this wetland assessment;
- Wetlands as indicated by the latest SANBI Geographical Information Systems (GIS) database are indicated in Figure 1-2 of the Wetland Report **(Annexure 6 of this Draft EIA Report)** and may or may not align to every extent of the desktop delineation and field delineation conducted as part of this study.
- The buffer zones indicated in this report are applicable to the delineated wetland for this study as well as the MPHG Wetlands within the Mining Right Area. Should any further development need to take place, ground thrusting first need to be undertaken.

Further limitations noted in terms of wetland studies in the Upper Olifants WMA as per DWA Information Analysis Report (20111).

- The scale of mapping of the wetlands may not be suited to the scale required for the classification study.
- Other gaps noted:
    - Lack of data on specific wetlands attributes and status of wetlands;
    - Water quality data of very few wetlands is known;
    - There was limited field verification, thus attributes included in the database were based on aerial photographs;
    - The status of the wetlands was the most inaccurate attribute, since it was also based on aerial photographs.

15.3 ARCHAEOLOGICAL IMPACT ASSESSMENT

The south-western section of Block E is used for crop cultivation, while the rest of the Block consists of open veld that used to be cultivated in previous years. The general visibility for this area was fairly good. The western half of Block F is associated with buildings, cultivated land and areas disturbed by mining activities. The eastern side, however, saw no cultivation in previous years, but the stream and dam located on this section led to dense vegetation cover and wet areas that hampered movement and visibility (Photo 7)

Photo 7:Dense vegetation and wet areas associated with the eastern half of Block F

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

16.1 Reasons Why The Activity Should Be Authorized Or Not

With the correct mitigation and management measures, including the incorporation of the 100m buffer around the identified wetland units (Units 1 -5), the Section102 EMP Amendment will be a sustainable project proposal which includes:

- The Implementation of new stormwater infrastructure (including. 5 x new Pollution Control Dam, pipes and trenches/berms) to ensure effective water management as per the National Water Act, 1998 (Regulation No. GN 77/GN 704)
- Undertaking of additional open cast mining on the Kleinfontein Colliery properties – within the existing mining right area (namely seam 2 on the Jicama South Resource Block and 4U seam on Keaton 4 seam resource block situated to the west of the tar road and east of the tar road at Jicama Block 2).
- Alignment of the existing approved EMPs with the newest NEMA EIA Regulations.
    - Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM
    - Jicama MR - MP 30/5/1/2/2/318 MR
- Continued Economic stimulation and social upliftment (i.e. job retainment, economic stimulation)
- Supply of coal to Eskom for power generation purposes and meeting of electricity demands

16.2 Conditions That Must Be Included In The Authorisation

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

- The inclusion of the 100 m buffer zone around wetland areas and surface water bodies
- The inclusion of the new proposed Stormwater Management Plan requirements (Eco Elementum Engineering (Pty) Ltd, 2018) as follow (as discussed under ***Sections 4.3.11*** and ***4.3.11***):
    - Dirty Water Infrastructure: Block A & D (Western PCD), Block B PCD, Block D (Eastern PCD), Block E PCD and Block F PCD
    - Six new grass lined clean water channels
    - Waste material generated on site (Type-3) and will require a Class C barrier as per the new waste classification regulations of the National Environmental Management: Waste Act 59 of 2008
- A Water Use License must be obtained prior to water uses being undertaken (activities within 500m of a wetland)
- Update the numerical and geochemical model against monitored data during operations every two years

- Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations.

- The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts

- All monitoring requirements to be undertaken throughout the LOM including:

    - Dust Monitoring.
    - Groundwater Monitoring.
    - Surface Water Monitoring.
    - Noise Monitoring.
    - Blasting and Vibration Monitoring.
    - Bio-Monitoring.

- Care must be exercised during construction phases in order to ensure the safeguarding of potential heritage resources. The only site of heritage importance observed on **Block E was the graveyard (KB01)**, which is protected by legislation.

16.2.2 Rehabilitation Requirements

Rehabilitation of the project will aim to:

- Ensure that the final elevation around the site is free draining.
- Ensure that soil replaced in the same sequence to ensure soil characteristics are retained as far as possible.
- Ensure a self-sustaining post-mining land capability similar to pre-mining of grazing and limited low-intensity arable lands.
- Ensure that the rehabilitated areas are cleared of all contaminating substances and that runoff from the area is returned to the natural catchment.
- Ensure that vegetation growth and cover on the rehabilitated areas is sustainable and local indigenous species are establishing on site and that succession and colonisation from surrounding areas is taking place on rehabilitated areas.
- Ensure that alien invasive growth is eradicated until the closure certificate is granted.
- The rehabilitation model must be drafted before final rehabilitation activities commence.
- In order to ensure rehabilitation of the site can be undertaken responsibly, soils must be stripped and stockpiled separately. This will ensure preservation of soil for re-use in rehabilitation of the site.
- The discard dump will be a permanent feature, as will the associated storm water management features around the dump, including the PCD. It is also anticipated that the main access road to site, and the roads to the mine residue dump be retained in order to undertake the necessary post-closure monitoring.

17. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The project life is estimated at 10 years. The EA and waste management license (WML) are being sought for a period of 15 years.

18. UNDERTAKING

The undertaking required to meet the requirements of this section is provided at the end of the EMP and is applicable to both the EIA/EMP.

19. 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).

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.

20. DEVIATIONS FROM THE APPROVED SCOPING REPORT

20.1 Deviations From The Methodology For Impact And Risk Assessment

No deviation has been made.

20.2 Motivation For The Deviation

Not applicable as no deviation has been made.

21. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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

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

- Refer to Annexure 8 of the detailed impact assessment.

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

- Care must be exercised during construction phases in order to ensure the safeguarding of potential heritage resources. The only site of heritage importance observed on **Block E was the graveyard (KB01)**, which is protected by legislation.

22. 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".

The alternatives assessed and the impacts associated with the alternatives assessed have been fully presented in Section 7 and the final layout has been motivated in this report. This final layout has formed the basis for the impact assessment in the EIA Report (Part A of this report) and the EMP (Part B of this report), which reports specific management and monitoring that will be required in terms of the final layout presented.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

23. DETAILS OF THE EAP

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

24. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Please refer to Section 4 Item 3(d) (ii): DESCRIPTION OF THE OVERALL ACTIVITY.

24.1 PROPOSED SECTION 102 EMP AMENDMENT ACTIVITIES

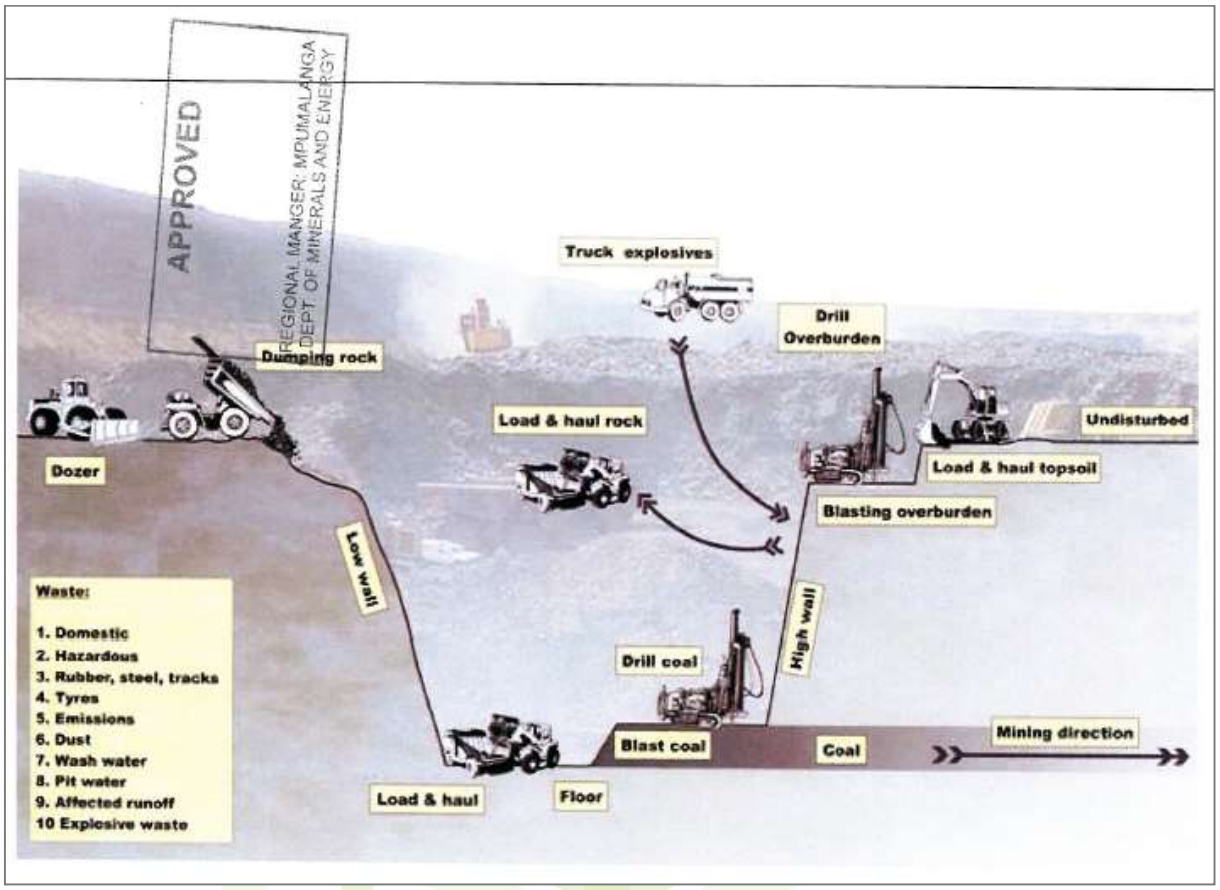
The amendment of the current EMP will allow for the following:

- Implementation of new stormwater infrastructure (including. 5 x new Pollution Control Dam, pipes and trenches/berms) to ensure effective water management as per the National Water Act, 1998 (Regulation No. GN 77/GN 704)
- Additional open cast mining on the Kleinfontein Colliery properties – within the existing mining right area (namely seam 2 on the Jicama South Resource Block and 4U seam on Keaton 4 seam resource block situated to the west of the tar road and east of the tar road at Jicama Block 2).
- Alignment of the existing approved EMPs with the newest NEMA EIA Regulations.
    - Kleinfontein - MP 30/5/1/2/2/17 MR, MP 30/5/1/2/3/2/1/ (17) EM
    - Jicama MR - MP 30/5/1/2/2/318 MR

24.2 EXISTING KLEINFONTEIN MINING ACTIVITIES

- **Mineral**: Coal (Bituminous Coal). Possible Pseudocoal and Torbanite will be mined if encountered.
- **Mining Method:** Opencast "Rollover Method".
- Depth of mineral below service: Depth of the lower coal seams varies from 15 to 55metres but could be up to 65 metres in isolated areas.
- **Geological Formation:** Coal bearing strata of the Witbank Coalfield as contained within the Vryheid Formation of the Ecca Group. The Vryheid formation varies from 60m to 200m in thickness in the area and consists of alternating sandstones and shales.
- **Product Market:** Eskom with the target of providing premium Eskom spec of 22.5MJ/kg CV (Calorific Value).
- **Life of Mine:** 6 years.
- **Life of Mine ROM Tonnage**: 4880 kt.
- **Annual Production:** 813 kt.
- **Coal Transport System:** Opencast – Haul trucks.

Existing infrastructure on site includes roads, a crusher, a beneficiation plant, a workshop area, stockpiles, a change house, offices, and 2xpollution control dams and associate canals.



25. . 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 - Appendix 3.

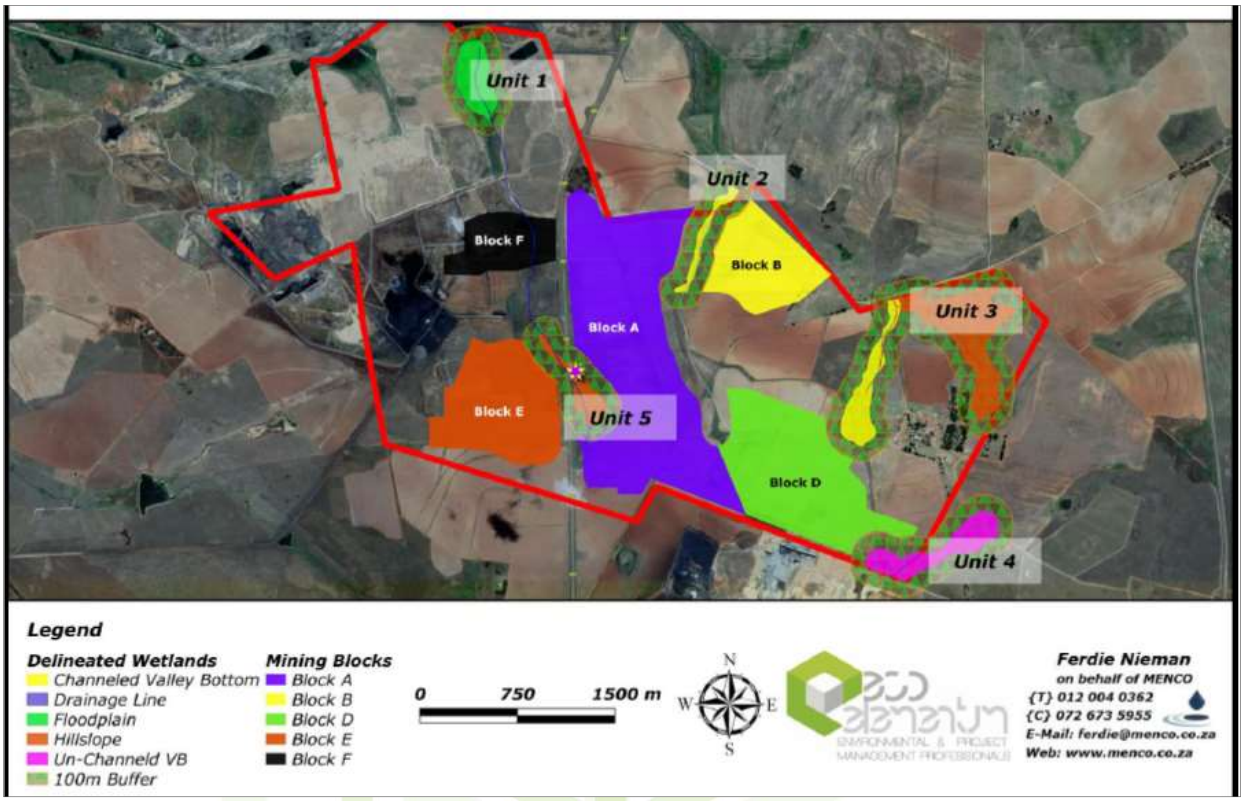


Figure 74: Composite Site Map

26. OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

26.1 DETERMINATION OF CLOSURE OBJECTIVES

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

Create a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;

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

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

Table 50: 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.

26.2 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.

26.3 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.

26.3.1 Steps Taken to Investigate, Assess and Evaluate the Impact of Acid Mine Drainage

The Geohydrological Assessment (GPT, 2018) identified the following potential sources of ACD including the groundwater vulnerability. Refer to Annexure 6.

The following is noted by Geo Pollution Technology Report (2018):

- 89%, 0% and 11% of the coal borehole samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- 33%, 0% and 67% of the sandstone samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- • 42%, 25% and 33% of the shale samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- • 100%, 0% and 0% of the coal stockpile samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- • 100%, 0% and 0% of the coal discard samples have respectively a large, low/medium and no potential to generate acid mine drainage;
- • The weighted average clastic rock will not become acidic.

- • However, if the NP of one outlier is omitted, the weighted average clastic rocks has a medium potential to generate acid-mine drainage.

Overall, it could be concluded that the coal and shale interburden have a significant potential to generate acid mine drainage. If left open to the atmosphere, the opencast pits will generate acidic drainage/seepage. Mitigation measures like flooding with water after closure and capping of mine waste with a soil layers will be crucial to avoid significant sulphide oxidation and subsequent acid mine drainage generation

26.3.2 Engineering or Mine Design Solutions to Be Implemented To Avoid or Remedy Acid Mine Drainage

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

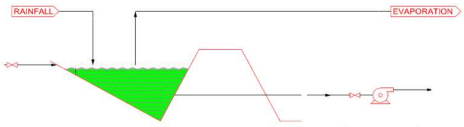
- Update the numerical and geochemical model against monitored data during operations every two years
- Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations and as feedback to stakeholders in the catchment, perhaps via the CMA (Catchment Management Agency).
- The hydro census and risk assessment should at least be repeated once before closure to measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.
- The monitoring as recommended in the report should be established prior to operation (including new monitoring points).
- The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts
- Waste material generated on site Type-3 and will require a Class C barrier as per the new waste classification regulations of the National Environmental Management: Waste Act 59 of 2008

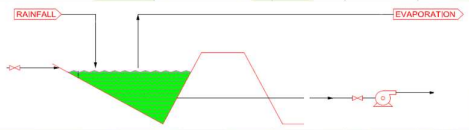
26.4 Volumes And Rate Of Water Use Required For The Mining Operation

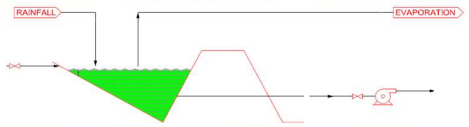
A conceptual water balance was prepared for the newly proposed open cast mining areas. The water balance was based on the proposed mining plan and existing water consumption figures provided by Kleinfontein. In total there will be five (5) PCD's collecting the dirty water generated form the respective mining blocks. The dirty water collected in the smaller PCD's (B, D, E and F) will be pumped to the larger, central PCD (AB). PCD-AB will function as a central distribution facility, from where the dirty water will be abstracted and re-used within the mining activities, to augment the coal processing plants' water deficit and for dust suppression. By augmenting the process water with dirty water runoff, the reliance on external, ground water resources can be significantly reduced. Dust suppression will be implemented on the stockpiles, loading platform, crushing area, overburden stockpiles and on the internal roads. Typically, the application rate for dust suppression will be limited to 1.0 l/m^2/day

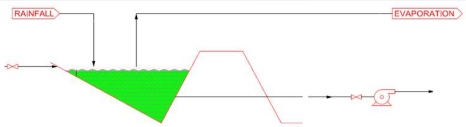
The water balance simulated indicated that a total of 30 m^3/d would be available for dust suppression, and an additional 44.3 m^3/d would be available

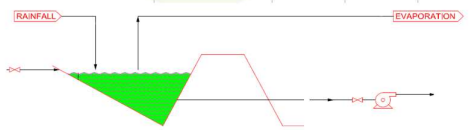
WATER BALANCE: KLEINFONTEIN					
Project Name:	Kleinfontein Water Use License				
Description of Project:	Open Cast Mine Water Balance				
PCD_AD					
	IN (m^3/d)			OUT (m^3/d)	
PCD Rainfall	20.7			9.4	Evaporation
Dirty Runoff	32.9			30.0	Dust Supression
PCD_B	0.1			44.3	Processing Plant
PCD_D	14.6				
PCD_E	10.8				
PCD_F	4.5				
TOTAL	83.7			83.7	TOTAL
PCD_B					
	IN (m^3/d)			OUT (m^3/d)	
PCD Rainfall	4.4			5.6	Evaporation
Dirty Runoff	1.3			0.1	Pumping to PCD_AD
TOTAL	5.7			5.7	TOTAL
PCD_D					
	IN (m^3/d)			OUT (m^3/d)	
PCD Rainfall	9.9			3.2	Evaporation
Dirty Runoff	7.9			14.6	Pumping to PCD_AD
TOTAL	17.9			17.9	TOTAL
PCD_E					
	IN (m^3/d)			OUT (m^3/d)	
PCD Rainfall	7.4			2.5	Evaporation
Dirty Runoff	5.9			10.8	Pumping to PCD_AD
TOTAL	13.3			13.3	TOTAL
PCD_F					
	IN (m^3/d)			OUT (m^3/d)	
PCD Rainfall	3.3			1.4	Evaporation
Dirty Runoff	2.6			4.5	Pumping to PCD_AD
TOTAL	5.9			5.9	TOTAL
DOMESTIC WATER USAGE					
	IN (m^3/d)			OUT (m^3/d)	
Ground Water	8.0			6.3	Septic Tank
				1.7	Losses
TOTAL	8.0			8.0	TOTAL











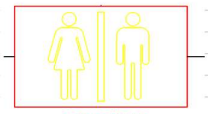


Figure 75: Wash Plant Water Balance

Table 51: Summary of Water Balance (Inflows)

AREA	IN (m³/annum)						TOTAL
PCD_AD	Rainfall	Runoff	PCD_B	PCD_D	PCD_E	PCD_F	
	7 562	12 019	52	5 338	3 937	1 641	**30 548**
PCD_B	Rainfall	Runoff					
	1 603	486					**2 089**
PCD_D	Rainfall	Runoff					
	3 631	2 886					**6 516**
PCD_E	Rainfall	Runoff					
	2 703	2 148					**4 851**
PCD_F	Rainfall	Runoff					
	1 197	951					**2 149**
DOMESTIC			Ground Water				
			2 920				**2 920**
					TOTAL		**49 073**

Table 52: Summary of Water Balance (Outflows)

AREA	OUT (m³/annum)				TOTAL
PCD_AD	Evaporation		Dust Supression	Make-Up	
	3 425		10 950	16 173	**30 548**
PCD_B	Evaporation	Pumping to			
	2037	52			**2 089**
PCD_D	Evaporation	Pumping to			
	1174	5343			**6 517**
PCD_E	Evaporation	Pumping to			
	914	3937			**4 851**
PCD_F	Evaporation	Pumping to			
	507	1641			**2 149**
DOMESTIC	Septic Tank		Losses		
	2300		620.5		**2 920**
TOTAL					**49 073**

Water for domestic use is currently abstracted from boreholes on site. The raw water is treated on site, by means of a small water treatment works (WTW), to potable water standards (SANS-241). The potable water is then conveyed to the various office buildings on site.

The total water demand was determined allowing for a maximum of one hundred (100) site staff, including labourers, per shift and a unit consumption of 80 l/c/d for temporary staff (i.e. day workers). The wastewater contribution per capita/unit as given in the DPW's design guidelines for small WWTW was used to calculate the theoretical current wastewater flow rates.

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

An updated water use license application (IWULA) and associated Integrated Water and Waste Management Plan (IWWMP) is in the process of being completed and will be submitted to the DWS.

26.5 Impacts To Be Mitigated In Their Respective Phases

The full impact assessment table with associated mitigation and management measures are presented in Appendix 8. The following specialist recommendations have been applied to all phases of the project in order to mitigate the identified impacts.

26.6 Specialist Impact Management Recommendations

The following specialist recommendations have been applied to all phases of the project in order to mitigate the identified impacts. Refer Attach copies of Specialist Reports as Appendices (Annexure 6).

Table 49: Summary of Specific Specialist Recommendations.

Specialist Study	Specialist Recommendation	Recommendation Included	Reference to Applicable Section in Report
Kleinfontein - Air Impact Assessment (Eco Elementum, 2018).	• Air Quality including dust monitoring should continue for the Life of Mine. • Should ambient dust levels exceed recommended standards and frequencies as per the Air Quality Act, then the management plan for dust will be re-evaluated and assessed to improve dust control on site. Actions could include: o Use of dust binding agents in areas of high dust generation. o Consideration of sprinkler systems in areas of high dust generation. o More frequent spraying programme.	YES	Refer to EMP Management Tables
Visual Impact Assessment (Eco Elementum, 2018)	• 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 will include final rehabilitation, after care and maintenance of the vegetation and to ensure that the final landform is maintained. • Plant indigenous trees to create a barrier between the neighbours and roads; • Dust from stockpile areas, roads and other activities must be managed by means of dust suppression to prevent excessive dust; • A wind barrier system that encloses the stockpiles and tailing dumps; • Stockpiles and waste rock dumps should not exceed 20 m in height; and • On-going rehabilitation of the area must be done as mining continues as per the current plan	YES	Refer to EMP Management Tables
EMP Review Audits (2015) **Umcebo Mining Environmental Authorisations Compliance Audit 2015 – Kleinfontein Colliery. Project A0564. Report No. JKC_0464.**	• Minimise the surface disturbance footprint new mining blocks. • 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. • Locate all soil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.	YES	Refer to EMP Management Tables

	• To minimise compaction associated with stockpile creation, it is recommended that the height of stockpiles be restricted between of 4 – 5 metres maximum. • Ensure all topsoil stockpiles are clearly and permanently demarcated and located in defined no-go areas. • 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. • Use appropriate methods of excavating that are in accordance with regulatory requirements and industrial best practices procedures; • Reduce slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; and • Use drainage control measures and culverts to manage the natural flow of surface runoff. • Existing established roads should be used wherever possible. No carbonaceous material must be used to construct access roads • 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. • 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; • Avoid waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste containing potentially contaminating fluids and other wastes; • Cleaning up areas of spillage of potentially contaminating liquids and solids. • 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. • Stockpiles should be managed so they do not become contaminated and then need additional handling or disposal; • A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; • Processing areas should be contained and systems designed to effectively manage and dispose of contained storm water, effluent and solids; • Storage tanks of fuels, oils or other chemicals 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 wash down 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. • 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 • Strip maximum amount of topsoil and place directly. Replace at least 600 mm of topsoil.		

	• A soil specialist should be appointed to conduct post- rehabilitation survey which includes o Assessment of the land form of the rehabilitated site; o Soil depth o Compaction, soil/spoil interface disturbance and rooting of vegetation. o Soil samples for chemical analyses. o Soil loss. o Land use capability post-mining with regard to slope, soil type and soil depth.		
Updated Groundwater impact study (Geo Pollution Technologies,2018*)*	• Along with normal best practice guidelines the mine should consider the following: o Placement of stockpiles, discard dumps etc outside the 100 m buffers o 100 m buffer from the edge of the Block B wetland system o 100 m buffer from the Block E wetland o 100 m buffer from the new Block F wetland o 100 m buffer from the Block E/D wetland o Reconsideration of mining Block C • By applying the above 100m buffer the wetland flow drivers could be lowered as follows (see Figure 20): o Block B Channelled valley bottom wetland – 45.5 % to less than 15% loss of flow drivers o Block C Channelled valley bottom wetland – 10.9 % loss to 0 % loss of flow drivers o Block C Hillslope seepage wetland – 2.2 % loss to 2.2 % loss of flow drivers o Block E/D Channelled valley bottom wetland – 28.7% to less than 9% loss of flow drivers o If mining considers mining out wetlands or to within 32 m buffers it recommended that further soil surveys and well as shallow piezometers be drilled between the proposed opencasts and the wetlands. Wetland offsets strategy could also be investigated o Update the numerical and geochemical model against monitored data during operations every two years o Water quantity and quality data should be collected on a regular, ongoing basis during mine operations. These data will be used to recalibrate and update the mine water management model, to prepare monitoring and audit reports, to report to the regulatory authorities against the requirements of the IWMP and other authorisations and as feedback to stakeholders in the catchment, perhaps via the CMA (Catchment Management Agency). o The monitoring as recommended in the report should be established prior to operation (including new monitoring points). o The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts	YES	Refer to EMP Management Tables

Kleinfontein Aquatic Ecological Study (Menco, 2018) ***Report Ref 201804/KC/Wet/V1***	• It is recommended that bio-monitoring be done on a bi-annual basis to ensure more accurate results for season variability between dry and wet season conditions. As the Leeuwfonteinspruit was fairly dry at the time of sampling the dry season conditions might produce fairly different results. Surface water should also be monitored on a bi-annual basis to successfully relate the change in habitat conditions to that of the water quality. • It is important to establish a database which contains the monitoring and bio-monitoring data from the current and future assessments. These will allow tracking any sudden or gradual changes in habitat conditions or water quality. This would help in identifying any potential external sources impacting the water quality and habitat conditions as well as direct impacts from the mine. The data basis will assist in providing long term trends in changes in environmental conditions. • The water quality results produced several non-compliant results when being compared to the WUL. It is thus important that Kleinfontein Colliery ensure that the water quality associated with the Colliery is compliant to the WUL. • Due to external influences potentially having a noticeable influence on the water quality and River morphology it is important to take appropriate actions to ensure that the receiving environment is improved. This can be done by ensuring that important wetland systems and River systems in the upper catchments are more widely protected and rehabilitated. It is also important to identify potential sources of pollution at an early stage after which water quality standards could be enforced. It is then also important to ensure that external sources maintain a high standard of water quality objectives. • It is also important to restore and rehabilitate channel morphology and riparian vegetation should any disturbances occur. It is very important to stabilise bank • erosion as this has had a particularly clear effect on the Leeuwfonteinspruit upstream and downstream sites. • The short-term objective for Kleinfontein Colliery would be to ensure that the current system does not degrade any further and that the health class remain with a Category C, while the long term objective is to implement appropriate actions above to ensure that the PES is controlled and maintained in a Health Class C which is also the recommended state for the river systems.	YES	Refer to EMP Management Tables
Surface Water Impact Assessment (Menco,2018) 201805/ECOE/KC_SUR/V1	• It is recommended that the mine investigate treatment options if the generation of AMD on site becomes evident as decanting into the Leeuwfonteinspruit will result in water quality deterioration. • The mine must implement a zero discharge policy and comply with GN 704 (or the latest) regulations in construction of storm water management infrastructure. • A comprehensive long term (at least 5 years) Integrated Monitoring and Environmental Management Plan (EMP) including aquatic and terrestrial ecosystems be devised. This should	YES	Refer to EMP Management Tables

	include a plan regarding the maintaining and rehabilitation of wetland areas impacted by the new mining activities. • Alternatives are considered for the effective recycling of an achievable amount of waste water. • The rehabilitation of disturbed mining areas to be free draining and re-vegetated to ensure clean run-off without the risk of erosion and siltation problems. With regards to future bio-monitoring the following recommendations are made: • A Fish Response Assessment would be a better indication to the toxic effects of the discharge. • Diatom sampling be conducted together with the Fish Response Assessment • Toxicity tests be conducted which should include bio-accumulation assessments in aquatic invertebrates located in the Leeuwfonteinspruit and Olifants River		
Kleinfontein Wetland Delineation (Menco, 2018) Report REF201805/ECOE/KC_WET/V1	• In terms of Section 40 of the National Water Act, 1998 (Act No. 36 of 1998), a WULA and Environmental Risk Assessment (ERA) must be submitted for all activities within 500 m of a wetland. • A minimum of 100 m buffer zone be maintained around the wetland areas wherein no surface mining or related activities are allowed to take place in order to protect the integrity of the wetland as these wetlands still remain an important wetland system in the region with a modified condition and high ecological importance and sensitivity class. • This 100M buffer zone should be clearly demarcated as a "NO GO" area to prevent any accidental entrance into the area. Cognisance is taken of the fact that final access road is simply the upgrading of an existing road and will be within close proximity to the railway line.This will have an insignificant impact on the wetland system especially if careful planning is considered for the construction of the crossing. • Undermining at Block E can be considered pending the outcome of the Geotechnical Assessment. • Any activities that may potentially result in significant adverse effect on the in wetland should be avoided at all costs. • Storm-water management practices must be applied and incorporated into management with the aid of a suitably qualified engineer to avoid disposal or spillage of any environmentally harmful materials or waste into the wetland. • Should the mitigation measures fail to adequately protect the integrity of the wetland habitat, compensatory measures in terms of a Wetland Offset Strategy needs to be investigated, motivated and presented to the Regulatory Authority. • Should the mine development in future needs to transgress the wetland areas, a water use license authorisation in terms of section 39 or 40 of the National Water Act, 1998 (Act No. 36 of 1998) for the Section 21(c) and (i) uses must be applied for. • A 100m buffer must be maintained at all time with the exception of the access road construction.	YES	Refer to EMP Management Tables

	• A Wetland Rehab & Maintenance Plan needs to be drafted and implemented to ensure that there is no degradation of Wetland Functionality. • An Alien Invasive Control Program must be drafted and implemented before additional opencast activities commence		
Kleinfontein Ecological Assessment Report (Eco Elementum, 2018)	• Ecological buffers proposed (100 m from the wetland areas should be adhered to and be excluded from the mining footprint). • 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. • 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. • Rehabilitation should take place concurrently with the prospecting and mining activities. Close monitoring of plant communities should be done to ensure that ecological balance is restored and the environment is self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary. 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: • Seasonal visual assessment of areas to determine if vegetation in undisturbed areas is being impacted.	YES	Refer to EMP Management Tables

Phase 1 Archaeological Impact Assessment For The Expansion Of The Kleinfontein Colliery Between Hendrina And Bethal, Mpumalanga (Tobias Coetzee, 2018) AIA-1604181	• Avoid potentially sensitive area and graveyard during construction and operational phases. • Ensure identified site K05 and Graveyard KB01 are not impacted • Sites K03, K04 and K06 are of recent origin and are therefore not important from a heritage perspective. No further action is therefore required. • Site K02 falls outside of the development footprint and will therefore not be impacted by the proposed development. However, should the proposed development affect this site, it is recommended that the kraal be recorded prior to destruction. • The recording of building foundation K01 during the survey is regarded as sufficient. Therefore, no further action is required. • Although disturbed, the area surrounding K05 dates to historical times. Therefore it is recommended that site K05 not be impacted by the proposed development. Monitoring should be done by an ECO to determine the level of impact caused by the proposed development. Should an impact be observed as a result of the proposed development, a qualified archaeologist must be contacted to provide further recommendations. Alternatively, should the destruction of the site be inevitable, a qualified archaeologist must recorded the site and a destruction permit must be obtained from the South African Heritage Resources Agency. • Because Graveyard KB01 is no longer in use, it is recommended that a fenced-off conservation buffer of 30m be established around the graveyard and that the graveyard be kept tidy. Access to the graveyard must not be refused and the mine ECO should regularly inspect the fence, as well as the graves. Should any additional damage be observed as a result of mining activities, a qualified archaeologist must be contacted to assess the situation to provide further recommendations. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried in the concerned graveyard. • 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.	YES	Refer to EMP Management Tables

	• From a heritage point of view, development may proceed on the demarcated portions, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.		
Noise Assessment (Ecoelementum, 2018)	• Noise monitoring is to be conducted on a quarterly basis throughout the life of the operation to determine the impact of the noise levels on the relevant noise sensitive receivers as well as determine the level of mitigation. Should the noise levels exceed the standards more stringent monitoring will be required in order to guide the management and mitigation measures to be implemented. • The noise measurements should be taken as per the ambient noise measurement locations of this report although additional noise monitoring points should be identified should other sensitive receptors become known during the life of the operation. • A report must be compiled quarterly and submitted to management to ascertain compliance with the required standards (if required monthly). • Management should be advised of any significant increase in the ambient sound level as operations continue. At each measurement point the ambient noise level will be sampled in terms of the following parameters: o The A-weighted equivalent sound pressures level (LAeq) for duration not less than 10 minutes per monitoring point. o Measurements to be taken during both during the daytime (06:00 to 22:00) and the night time (22:00 to 06:00).		
Socio-Economic Impact Assessment Report (Gibb, 2018)	• 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 councillors (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. • Retain as much construction expenditure as possible in the regional economy; • Facilitate benefits to and opportunities for local business; and	YES	Refer to EMP Management Tables

	• 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 of the Social Labour Plan and monitor progress annually (performance review). • Adhere to all existing lease agreement with landowners • Adhere to the Relocation Plans that has been signed with affected parties		
Kleinfontein Final rehabilitation, decommissioning and mine closure plan (Eco Elementum, 2018)	• The following closure criteria is relevant to the Mine 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. 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;	YES	Refer to EMP Management Tables

	○ 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.		

27. IMPACT MANAGEMENT OUTCOMES

SOIL MANAGEMENT:

- Minimise the surface disturbance footprint
- 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 (Roll over Method)

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 additional mining activities
- Adequate PPE given to staff exposed to high noise levels
- Machinery is kept in good condition.

SURFACE WATER MANAGEMENT

- 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 (100m buffer) 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 water use authorisations.
- No mining activity within the footprint of the delineated wetlands with protective buffer zone (100m unless otherwise approved).
- Compliance to the NWA Standards and License conditions.

GROUNDWATER MANAGEMENT

- Prevention of hydrocarbon groundwater contamination.
- Management of groundwater inflows & prevention of contamination.
- Management of groundwater inflows & prevention of contamination.
- Compliance to the NWA Standards and License conditions.

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.
- Care must be exercised during construction phases in order to ensure the safeguarding of potential heritage resources. The only site of heritage importance observed on Block E was the graveyard (KB01), which is protected by legislation. Potentially sensitive areas also in include Block F

27.1 FINANCIAL PROVISION

27.1.1 Determination of the Amount of Financial Provision

27.1.1.1 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 89.

27.1.1.2 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 9.

27.1.1.3 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 9.

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

Financial Provision, to the amount of ***R 31, 342 296.40*** be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

Table 53: Financial Provision Quantum Sheet

CALCULATION OF THE MINE CLOSURE QUANTUM							
Mine: Kleinfontin Colliery						Province: Mpumlanga	
Evaluators: Eco Elementum (Pty) Ltd						Date: June 2018	
General Information	Risk Class	High (A)					
	Environmental Sensitivity	Medium					
	WF 1: Nature of Terrain Weighting Factor	Flat 1.00					
	WF 2: Proximity to Urban Area Weighting Factor	Peri-Urban 1.05					
Component No	Main Activities Itemized Descriptions	[B] CPI Adjusted Master Rate	[A] Quantity	Units	[C] Multiplication Factor	[D] Weighting Factor 1: Nature of Terrain	Sub Totals [E = A*B*C*D]
		STEP 4.3	STEP 4.5		STEP 4.3	STEP 4.4	
1	Dismantling of processing plant and structures	R 13.46	20000.00	m3	1.00	1.00	R 269 179.09
2(A)	Demolition of steel buildings and structures	R 187.48	1500.00	m2	1.00	1.00	R 281 217.16
2(B)	Demolition of reinforced concrete buildings and structures	R 276.28	2500.00	m2	1.00	1.00	R 690 708.81
3	Rehabilitation of access roads	R 33.55	9000.00	m2	1.00	1.00	R 301 938.42
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	850.00	m2	1.00	1.00	R 318 712.78
6	Opencast rehabilitation including final voids and ramps	R 190 832.98	35.00	ha	0.52	1.00	R 3 473 160.20
7	Sealing of shafts, adits and inclines	R 100.65	0.00	m3	1.00	1.00	R 0.00
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	20.00	ha	0.80	1.00	R 7 584 377.47
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	150.00	ha	1.00	1.00	R 5 823 615.00
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	20.00	ha	0.67	1.00	R 528 885.61
14	2 to 3 years of maintenance and after care	R 13 814.18	150.00	ha	1.00	1.00	R 2 072 126.44
15	Specialist study				1.00	1.00	R 0.00
						Subtotal (1 to 15 above)	R 21 462 328.23
	Subtotal 1			Weighting Factor 2		1.05	R 22 535 444.64
1	Preliminary and General					12% of Subtotal 1 if less than R100mil 6% of Sub Total 1 if more than R100mil	R 2 704 253.36
2	Contingency					10% of Sub Total 1	R 2 253 544.46
						Subtotal 2 (Subtotal 1 plus sum of management and contingency)	R 4 957 797.82
						Subtotal 3	R 27 493 242.46
						GRAND TOTAL (Subtotal 3 plus 14% VAT)	R 31 342 296.40

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27.2 Impact Management Actions

Please refer to Appendix 8

28. 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 7 for detailed management and monitoring plans

Table 54: Proposed Monitoring Requirements

<table>
<tr><th>Aspect</th><th>Requirement</th></tr>
<tr><td>Air</td><td>

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 is recommended at the locations shown in this report.
Indicative PM10 and PM2.5 dust monitoring must also be undertaken at the same sites as mentioned under the previous bullet but also in and around potential fugitive emission sources to determine mitigation measures and focus management efforts.

</td></tr>
<tr><td>Surface Water</td><td>
Quality monitoring against parameters as required by the IWUL.
Water quality monitoring parameters proposed for Kleinfontein Colliery to be monitored on a monthly frequency
New monitoring points for the potential opencast section will depend on the final location of the pit and the storm water management infrastructure. Water pumped from the pit needs to be monitored for quality (monthly) as well as quantity (daily). The quality (quarterly) and quantity (weekly) if water in the proposed storm water dam also needs to be monitored for the variables as indicated in the Table below.
Water used for dust suppression needs to be monitored for quality (monthly) and quantity (daily).
Water levels for all pollution control dams (Weekly).
Water abstracted from the borehole (daily).
Water Quality Parameters
<table>
<tr><th>Variable</th><th>Unit</th></tr>
<tr><td>pH</td><td></td></tr>
<tr><td>Electrical Conductivity as EC</td><td>mS/m</td></tr>
<tr><td>Suspended Solids as SS</td><td>mg/l</td></tr>
<tr><td>Total Dissolved Solids as TDS</td><td>mg/l</td></tr>
<tr><td>Sulphate as SO_4</td><td>mg/l</td></tr>
<tr><td>Nitrate as NO_3</td><td>mg/l</td></tr>
<tr><td>Sodium as Na</td><td>mg/l</td></tr>
<tr><td>Chloride as Cl</td><td>mg/l</td></tr>
<tr><td>Calcium as Ca</td><td>mg/l</td></tr>
<tr><td>Potassium as K</td><td>mg/l</td></tr>
<tr><td>Magnesium as Mg</td><td>mg/l</td></tr>
<tr><td>Total hardness as $CaCO_3$</td><td>mg/l</td></tr>
<tr><td>Total alkalinity</td><td>mg/l</td></tr>
<tr><td>Total acidity</td><td>mg/l</td></tr>
<tr><td>Fluoride as F</td><td>mg/l</td></tr>
<tr><td>Variable</td><td>Unit</td></tr>
<tr><td>Aluminium as Al</td><td>mg/l</td></tr>
</table>
</td></tr>
</table>

	<table><tr><td>Iron as Fe</td><td>mg/l</td></tr><tr><td>Manganese as Mn</td><td>mg/l</td></tr></table>
Groundwater	A groundwater monitoring network should contain monitoring positions which can assess the groundwater status at certain areas. The boreholes can be grouped classification according to the following purposes: • **Source monitoring:** Monitoring boreholes are placed close to or in the source of contamination to evaluate the impact thereof on the groundwater chemistry. • **Plume monitoring:** Monitoring boreholes are placed in the primary groundwater plume's migration path to evaluate the migration rates and chemical changes along the pathway. • **Impact monitoring:** Monitoring of possible impacts of contaminated groundwater on sensitive ecosystems or other receptors. These monitoring points are also installed as early warning systems for contamination break-through at areas of concern. • **Background monitoring:** Background groundwater quality is essential to evaluate the impact of a specific action/pollution source on the groundwater chemistry. In the operational phase and closure phase, quarterly monitoring of groundwater quality and groundwater levels is recommended. Quality monitoring should take place before after and during the wet season, i.e. during September and March. It is important to note that a groundwater-monitoring network should also be dynamic. This means that the network should be extended over time to accommodate the migration of potential contaminants through the aquifer as well as the expansion of infrastructure and/or addition of possible pollution sources. Currently a monitoring network exists for the site, however the drilling of additional boreholes is recommended. The recommended boreholes are listed in and the areas to site these monitoring boreholes are shown in **Figure 58)**. These boreholes can be utilised for water level monitoring during operations, as well as groundwater quality monitoring after decommissioning of the site. However, a monitoring network should be dynamic. This means that the network should be extended over time to accommodate the migration of contaminants through the aquifer as well as the expansion of infrastructure and/or addition of possible pollution sources. An audit on the monitoring network should be conducted annually
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. It is recommended that bio-monitoring be done on a bi-annual basis to ensure more accurate results for season variability between dry and wet season conditions. As the Leeuwfonteinspruit was fairly dry at the time of sampling the dry season conditions might produce fairly different results. Surface water should also be monitored on a bi-annual basis to successfully relate the change in habitat conditions to that of the water quality.
Visual	Photographic records should be maintained together with findings, follow up actions and close out records as part of the Environmental Management System.

Heritage	Although disturbed, the area surrounding K05 dates to historical times. Therefore it is recommended that site K05 not be impacted by the proposed development. Monitoring should be done by an ECO to determine the level of impact caused by the proposed development. Should an impact be observed as a result of the proposed development, a qualified archaeologist must be contacted to provide further recommendations. Alternatively, should the destruction of the site be inevitable, a qualified archaeologist must recorded the site and a destruction permit must be obtained from the South African Heritage Resources Agency. Regularly during construction and operational phases
Noise	Noise monitoring is to be conducted on a quarterly basis throughout the life of the operation to determine the impact of the noise levels on the relevant noise sensitive receivers as well as determine the level of mitigation. Should the noise levels exceed the standards more stringent monitoring will be required in order to guide the management and mitigation measures to be implemented. The noise measurements should be taken as per the ambient noise measurement locations of this report although additional noise monitoring points should be identified should other sensitive receptors become known during the life of the operation. A report must be compiled quarterly and submitted to management to ascertain compliance with the required standards (if required monthly). Management should be advised of any significant increase in the ambient sound level as operations continue. At each measurement point the ambient noise level will be sampled in terms of the following parameters: • The A-weighted equivalent sound pressures level (LAeq) for duration not less than 10 minutes per monitoring point. • Measurements to be taken during both during the daytime (06:00 to 22:00) and the night time (22:00 to 06:00).

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.

29. 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 55: 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 WUL
Construction, Operation and Decommissioning Activities	Water Quantity	Water Balance to be Updated Annually Flow Meter Reading and Update of Datasheet	SHEQ/ Engineering	Daily
Construction, Operation and Decommissioning Activities	Bio-Monitoring	SASS 5 and IHAS Sampling Sites are to be established upstream and downstream of all Potential Impact	Aquatic Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Storm Water Management	Visual Inspection Check the system for blockages and possible spillage areas	SHEQ/ Engineering	After heavy rainfall
Construction, Operation and Decommissioning Activities	Biodiversity Assessment	Align the Fauna & Flora Compare the annual findings with those of the Baseline Studies	Ecologist	Annually
Construction, Operation and Decommissioning Activities	Alien Invasive Control Program (AICP)	Implement an Alien Invasive Control Programme. During the Biodiversity Assessment a qualified ecologist must be contracted to ensure that the implementation of the AICP are adequately addressed.	Ecologist	Bi-Annually

Construction, Operation and Decommissioning Activities	Vegetation and Rehabilitation	RSIP to be adhered to As specified in EMP	Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Groundwater Quality	SANAS Standards As specified in Geo-Hydro Report	Independent Specialist	As specified in Geo-Hydro Report
Construction, Operation and Decommissioning Activities	Groundwater Levels	Depth meters Determine the groundwater fluctuation over a LOM	Independent Specialist	Determine the groundwater fluctuation over a LOM
Construction, Operation and Decommissioning Activities	Dust Fallout	Implement a Monitoring Programme Gravimetric Dust Fallout	To be analysed by an Accredited Laboratory Independent Specialist	Monthly
Construction, Operation and Decommissioning Activities	Environmental Noise & Vibration	Implement a Monitoring Programme SANAS Standards Noise monitoring are to be done to determine the effect of mining, and associated activities, on the receptors	Independent Specialist (Noise Specialist)	Annually
Construction, Operation and Decommissioning Activities	Visual Inspection of receptors	Implement Monitoring Schedule in-house Physical Census Any incidents of cracking must be recorded and addressed.	SHEQ/ Engineering	Before and After each blasting event

30. ENVIRONMENTAL AWARENESS PLAN

30.1 Manner In Which The Applicant Intends To Inform Employees Of Environmental Risk Which May Result From Their Work

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 Mandlaglo 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 Tala Bethal Coal.

General Training:

- Environmental awareness training;
- Awareness of the Witbank Brickworks (1961) (Pty) Ltd: Tala Bethal Coal SHEQ policy; and
- Awareness of environmental legislation or any other requirements Tala Bethal 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 Tala Bethal 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 Tala Bethal 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 Tala Bethal Coal is serious about the environment's well–being, empowerment of the local people and returning the land to appropriate use once the reclamation activities have been completed. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Emergency Response Plan

The EMP and other management options are intended to minimise all environmental risks as far as possible. Should there for some reason is unforeseen circumstances that might lead to unacceptable risks, emergency systems and procedures have been especially designed for this operation and is to be adhered in the case of such emergencies. The environmental emergency contingency plan addresses any reasonably anticipated failure (most probable risk) for the entire mining area and focuses on incidents that could cause environmental emergencies. As with any system, the most important and critical component is the identification and communication with the Responsible personal. Consequently, the contact information for these role-players should be available around the facility and be updated on a regular basis. In addition to this, first-party employees (such as security, safety superintendents, mine overseers, environmental officers) will be trained to respond to the responsible personnel in the event of an emergency.

Table 56: Emergency Response and Preparedness Plan

POSSIBLE ENVIRONMENTAL RELATED EMERGENCY	ACTION PLANS / REMEDIATION	TIME / PERIOD	RESPONSIBLE PERSON / PARTY
Hydrocarbon Spill (diesel, oil, grease, etc.)	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. The Environmental Management Representative will have the contact details of companies that provide this service.	Immediately	Immediate Supervisor
Veld Fires	The mine management team must ensure that trained personnel are appointed and that firefighting equipment is in serviceable order. The responsible person must ensure that fire breaks are maintained. The responsible person must undertake periodic inspections of firefighting equipment. In the event of a fire on site the fire master and firefighting crew must immediately respond and in instances where the mines firefighting team is unable to control the fire, the services of the local municipal fire brigade must be called in. The fire master is responsible for ensuring that adequate arrangements are made with the local municipal fire brigade to ensure timeous response to veld fires.	Ongoing	Fire Master / Safety Officer
Explosions	Alternative evacuation routes should be identified and used, should the exit to the mine be blocked. Alternative air supply routes should be identified and implemented. All relevant emergency response units must be notified and hospitals informed of potential incoming patients. The Environmental Management Representative will assess the situation from the information provided and set up an investigation team or relevant personnel. This team may include the Operations Manager, Chief Safety Officer, the employee who reported the incident and the individual responsible for the incident.	Immediately	Mine Manager
Pollution Control Dam Overflow	Stop all pumping from underground if this is compounding the problem. Pump the water from the overflowing dam to any other dam that is not full, preferably one of the underground water containment areas. Pump as much water as possible into the underground containment areas to increase the capacity of the surface dams to contain run-off water. Monitor the spillway for erosion of the dam wall. If erosion occurs, reinforce the wall with sandbags.	Immediately	Plant Manager

Pollution Control Dam Breach	Prevent overflow from the adjacent dam by sandbagging the overflow point. Stop all pumping from underground. Pump remaining water in the breached into the underground water containment areas or into the other pollution control dams. Pump as much water as possible into the underground containment areas to increase the capacity of the surface dams to contain run-off water.	Immediately	Plant Manager
Berm Breach / Drain Overflow	Where there has been overflow due to a blockage, the drain must be cleaned as soon as possible. Where the overflow is the result of a lack of capacity the dimensions of the drain must be increased. A breached berm must be repaired as soon as possible. The dimensions of a breached berm must be increased to prevent a recurrence.	Immediately	Manager / Plant Manager
Leakage or spill from the chemical toilets and associated infrastructure.	The failure of the chemical toilets and associated infrastructure poses a threat to both groundwater and surface water resources. In the event of a failure, the following procedures must be followed: • The incident must be reported to the Environmental Management Representative immediately. • An investigation team, set up by the Environmental Management Representative must investigate the cause of the failure. • Precautions must be taken to prevent the spread of any contaminants/material, especially into surface water courses. • Repairs must be commissioned as soon as possible, followed by an inspection to determine if repair work was efficient, and to detect any overlooked or future potential issues. • 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

31. 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/EMP.

- A3 size locality map is included in Appendix 2.

32. REFERENCES

- Kleinfontein Air Quality Assessment Report (Eco Elementum, 2018).
- Kleinfontein Visual Impact Assessment (Eco Elementum, 2018).
- Kleinfontein Aquatic Ecological Study (Menco, 2018).
- Kleinfontein Coal Wetland Delineation (Menco, 2018).
- Kleinfontein Ecological Assessment Report (Eco Elementum, 2018).
- Updated Groundwater Study for Kleinfontein Colliery (Geo Pollution Technologies, 2018)
- A Phase 1 Archaeological Impact Assessment for the Proposed Kleinfontein Expansion Project between Hendrina and Bethal, Mpumalanga (Tobias Coetzee, 2018).
- Kleinfontein Social Impact Assessment Report (Ecoelementum, 2018).
- Kleinfontein: Final rehabilitation, decommissioning and mine closure plan (Eco Elementum, 2018)
- Bio-monitoring assessments for the dry and wet season (Carin Bosman Sustainable Solutions, 2012)
- Bio-monitoring assessments for the dry and wet season (Carin Bosman Sustainable Solutions2015)
- Kleinfontein Colliery: Jikama EMPR Revision 2 (Jaco -K Consulting 2009)
- Stormwater Management Plan (Eco Elementum Engineering, 2018)

33. LIST OF ANNEXURES

- **Annexure 1 - Qualifications of the EAP**
- **Annexure 2 - Environmental Assessment Practitioner CV**
- **Annexure 3 - Locality Maps**
- **Annexure 4 - Mine Layout and Infrastructure Maps**
- **Annexure 5 - Public Participation Process**
- *Annexure 5.1: Register for I&AP's/Database*
- *Annexure 5.2: Landowner Communication and Comment*
- *Annexure 5.3: Advertisement*
- *Annexure 5.4: Newspaper Adverts*
- *Annexure 5.5: Announcement and Scoping Phase and Report Deliveries*
- *Annexure 5.6: EIA Phase Notifications and Report Deliveries*
- *Annexure 5.7: Attendance Registers*
- *Annexure 5.8: Comment and Communication Received from I&APs*
- *Annexure 5.9: Comments and Response Report*
- **Annexure 6 - Specialist Studies**
- **Annexure 7 – Social and Labour Plan**
- **Annexure 8 – Impact Assessment and Mitigation Tables**
- **Annexure 9 – Closure and Rehabilitation Plan**
- **Annexure 10 – Stormwater Management Plan**
- **Annexure 11 – Mine Works Programme**
- **Annexure 12- DMR Correspondence**

34. 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