



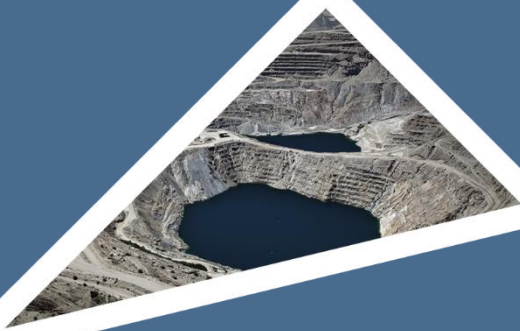
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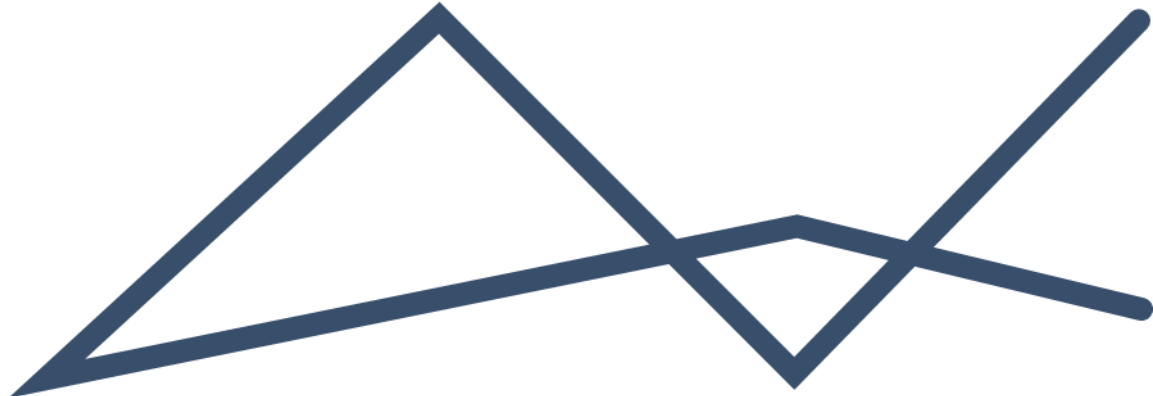
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ENVIRONMENTAL SCOPING REPORT FOR PUBLIC REVIEW

VLAKVARKFONTEIN COAL MINE EXTENSION, ASSOCIATED
INFRASTRUCTURE AND AMENDMENTS TO EXISTING LICENCE
CONDITIONS





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CONDITIONS

COMPANY: NTSHOVELO MINING RESOURCES (PTY) LTD

MINING RIGHT: MP 30/5/1/2/2/300 MR

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Appendices

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APPENDIX B: PUBLIC PARTICIPATION INFORMATION

APPENDIX C: COPY OF APPLICATION FORM

APPENDIX D: IMPACT ASSESSMENT MATRIX



Abbreviations

AMD	:	Acid Mine Drainage
CMA	:	Catchment Management Agency
DEA	:	Department of Environmental Affairs
DMR	:	Department of Mineral Resources
DWA	:	Department: Water Affairs
DWS	:	Department of Water Affairs and Sanitation
EIA	:	Environmental Impact Assessment
EIMS	:	Environmental Impact Management Services
ELWU	:	Existing Lawful Water Use
EMPR	:	Environmental Management Programme Report
ESA	:	Early Stone Age
GA	:	General Authorisation
GHG	:	Greenhouse Gas
GN	:	Government Notice
GSW	:	Geo Soil and Water
HIA	:	Heritage Impact Assessment
I&AP	:	Interested & Affected Party
IBA	:	Important Bird Area
MAE	:	Mean Annual Evaporation
mamsl	:	metres above mean sea level
MAP	:	Mean Annual Precipitation
MAR	:	Mean Annual Runoff
MCM	:	Million cubic metres
MPRDA	:	Minerals and Petroleum Resources Development Act, 2002
NEM:WA	:	National Environmental Management: Waste Amendment Act, 2008
NEMA	:	National Environmental Management Act, 2002
NEMA	:	National Environmental Management Act
NGDB	:	National Groundwater Database
NHRA	:	National Heritage Resources Act
NWA	:	National Water Act, 1998
PHRA	:	Provincial Heritage Resources Authority
RoM	:	Run of Mine
SAHRA	:	South African Heritage Resources Agency
WMA	:	Water Management Area
WUL	:	Water Use Licence



EXECUTIVE SUMMARY

Ntshovelo Mining Resources (Pty) Ltd (Ntshovelo) a subsidiary of Mbuyelo Coal (Pty) Ltd. has an approved Mining Right (MR) (Ref No: MP 30/5/1/2/2/300 MR) and Environmental Management Programme (EMPR), in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002, as amended) (MPRDA), for the mining of coal at the Vlakvarkfontein Coal Mine. Ntshovelo wishes to extend the mining operations at the Vlakvarkfontein Coal Mine, located on Portions 5, 13, and 18 of the Farm Vlakvarkfontein 213 IR. The mining area is situated approximately 30 km north east of Delmas, and approximately 15 km south west of Ogies. The N12 highway passes to the north of the mining area. The project falls within the Nkangala District Municipality and the Delmas Local Municipality.

It is proposed to expand the open cast mining operations, using the roll-over mining method, onto Portion 5 of the farm Vlakvarkfontein 213IR. This area is within the existing approved mining right boundary but was not specifically included and assessed in the approved Environmental Management Programme Report (EMPR) and associated environmental permits and authorisations. The proposed new mining operations will necessitate the relocation and re-establishment of the existing ancillary infrastructure associated with the current mining operations, including the Pollution Control Dam (PCD) and the administrative structures. It is also proposed to establish a coal processing plant (wash plant) to decontaminate the Run of Mine (RoM) coal. An application for the amendment to the existing Mine Works Programme (MWP) and EMPR, through an MPRDA Section 102 Application, and a full Environmental Impact Assessment (EIA) for the proposed new mining area is, therefore, required to support an application for environmental authorisation (EA) / waste management licence (WML) as applicable. A new water use licence application (WULA) for the relevant water use triggers associated with the proposed project will also be undertaken.

PURPOSE OF THE SCOPING REPORT

The purpose of the scoping process, through a consultative process, is to:

- Identify the policies and legislation that are relevant to the activity;
- To motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- To identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking;
- To identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process including cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- To identify the key issues to be addressed in the assessment phase;
- To agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required, as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- To identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.



PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) for the proposed project has been undertaken in accordance with the requirements of the MPRDA, and NEMA in line with the principles of Integrated Environmental Management (IEM). The PPP commenced on the 7th of August 2017 with an initial notification and call to register for a period of 30 days, ending on the 11th of September 2017. This scoping report has been made available for public review and comment for a period of 31 days from. The comments received from I&AP's during these commenting periods so far have been captured in an Issues and Response summary table included in the scoping. Comments received during this review period will also be addressed and added to the Issues and Response summary for inclusion in the Final Scoping Report to be submitted to DMR at the end of the review period. On acceptance of the scoping report from DMR, an EIA Report, including an Environmental Management Programme (EMPR), will also be compiled and presented for public comment as part of this EIA process during which time further stakeholder engagement will take place.

This scoping report has been made available for review from the 19th of October 2017 to the 20th of November 2017. Please ensure all comments on the scoping report are submitted to EIMS by 20 November 2017. Contact details are provided below:

Environmental Impact Management Services (Pty) Ltd (EIMS)

P.O. Box 2083 Pinegowrie 2123

Phone: 011 789 7170 / Fax: 011 787 3059

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ENVIRONMENTAL IMPACT ASSESSMENT

A high-level assessment was undertaken to identify all the potential risks and impacts associated with each phase of the mining operations. The background information from existing EIA and specialist studies undertaken for the site were consulted as well as a screening of all the activities underway and planned for the mine to ensure that all of the potential impacts have been identified. Each of the identified risks and impacts for these phases was assessed using the GSW impact assessment methodology described in the body of the report. The assessment criteria include the nature, extent, duration, magnitude/intensity, reversibility, probability, public response, cumulative impact, and irreplaceable loss of resources.

The most significant risks and impacts identified were those that remain high in terms of significance even post mitigation measures being considered. The following impacts were determined to have a potentially moderate

- high negative final significance:

- Groundwater contamination;
- Pollution of surface water resources/decreased water quality
- Dewatering of groundwater aquifers;
- Pollution of groundwater/decreased water quality;
- Acid Mine Drainage (AMD);
- Decant;
- Emissions and dust;
- Blasting and vibration;
- Impact on wetlands and drainage lines;



- Invasion of alien species; and
- Social issues.

In terms of positive impacts, the following key benefits have been identified:

- Coal supply for energy security; and
- Continued economic growth.

The negative impacts will be further assessed during the EIA phase of the project. Potential mitigation measures have been identified and will be refined based on input from the EAP, public consultation, and specialist assessments during the EIA phase of the project. The EMPR will, identify appropriate mechanisms for avoidance and mitigation of the negative impacts and enhancing the positive.



1 INTRODUCTION

Ntshovelo Mining Resources (Pty) Ltd (Ntshovelo) a subsidiary of Mbuyelo Coal (Pty) Ltd. has an approved Mining Right (Reference: MP 30/5/1/2/2/300 MR) and Environmental Management Programme (EMPR), in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002, as amended) (MPRDA), for the mining of coal at the Vlakvarkfontein Coal Mine. Ntshovelo wishes to extend the mining operations at the Vlakvarkfontein Coal Mine, located on Portions 5, 13, and 18 of the Farm Vlakvarkfontein 213 IR. The mining area is situated approximately 30 km north east of Delmas, and approximately 15 km south west of Ogies. The N12 highway passes to the north of the mining area. The project falls within the Nkangala District Municipality and the Delmas Local Municipality.

It is proposed to expand the open cast mining operations, using the roll-over mining method, onto Portion 5 of the farm Vlakvarkfontein 213IR. This area is within the existing approved mining right boundary but was not specifically included and assessed in the approved Environmental Management Programme Report (EMPR) and associated environmental permits and authorisations. The proposed new mining operations will necessitate the relocation and re-establishment of the existing ancillary infrastructure associated with the current mining operations, including the Pollution Control Dam (PCD) and the administrative structures. It is also proposed to establish a coal processing plant (wash plant) to decontaminate the Run of Mine (RoM) coal. An application for the amendment to the existing Mine Works Programme (MWP) and EMPR, through an MPRDA Section 102 Application, and a full Environmental Impact Assessment (EIA) for the proposed new mining area is, therefore, required to support an application for environmental authorisation (EA) / waste management licence (WML) as applicable. A new water use licence application (WULA) for the relevant water use triggers associated with the proposed project will also be undertaken.

The Vlakvarkfontein Mine has been in operation for several years and as such a number of licenses and authorisations are held by the mine. The following rights, licenses, authorisations and approvals are currently in place and have been considered in the compilation of this report:

Table 1: Existing rights, licenses and authorisations for Vlakvarkfontein Coal Mine

Document	Consultant	Applicable Properties	Reference Number
MPRDA EIA and EMPR (2009)	Geovicon Environmental (Pty) Ltd.	Portion 3, 5 and 13 of Vlakvarkfontein 213 IR	MP 30/5/1/2/3/2/1 (300) EM
IWWMP and Water Use Licence (2011)		Portion 3, 5 and 13 of Vlakvarkfontein 213 IR	4/B20F/AGJ/1131
IWWMP and Water Use Licence Amendment (2014)	Geo Soil and Water CC	Portion 3, 5 and 13 of Vlakvarkfontein 213 IR	4/B20F/AGJ/1131
IWWMP Consolidation (2015)	Geo Soil and Water CC.	Portion 3, 5 and 13 of Vlakvarkfontein 213 IR	4/B20F/AGJ/1131

In addition to the approved authorisations and licenses listed in Table 1, Ntshovelo also wish to amend the approved MR (MP 30/5/1/2/2/112 MR) and EMPR, to extend the mining operations within the approved MR boundary at the Vlakvarkfontein Coal Mine, located on Portions 5, 13, and 18 of the Farm Vlakvarkfontein 213 IR. The extension of the mining operations will require the relocation and re-establishment of the existing ancillary infrastructure associated with the current mining operations, including the PCD and the administrative structures. It is also proposed to establish a coal processing plant (wash plant). Ntshovelo is required to assess any new environmental impacts associated with the change in the mining programme and area, and to establish appropriate mitigation measures to address the impacts.



1.1 REPORT STRUCTURE

This report has been compiled in accordance with the 2014 NEMA EIA Regulations. A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 2 below.

Table 2: Report Structure

Environmental Regulation	Description	Section in Report
NEMA Regulation 982 (2014)		
Appendix 2(2)(a):	Details of – i) The EAP who prepared the report; and ii) The expertise of the EAP, including a curriculum vitae;	1
Appendix 2(2)(b):	The location of the activity. Including – i) The 21-digit Surveyor General code of each cadastral land parcel; ii) Where available, the physical address and farm name; iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	2
Appendix 2(2)(c):	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii) On a land where the property has not been defined, the coordinates within which the activity is to be undertaken;	2
Appendix 2(2)(d):	A description of the scope of the proposed activity, including – i) All listed and specified activities triggered; ii) A description of the activities to be undertaken, including associated structures and infrastructure;	3



Appendix 2(2)(e):	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;	4
Appendix 2(2)(f):	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	5
Appendix 2(2)(h):	<p>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including –</p> <ul style="list-style-type: none"> i) Details of all alternatives considered; ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts – <ul style="list-style-type: none"> aa. Can be reversed; bb. May cause irreplaceable loss or resources; and cc. Can be avoided, managed or mitigated; vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii) The possible mitigation measures that could be applied and level of residual risk; ix) The outcome of the site selection matrix; x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity; 	6,7, 8, 9, 10 and 11
Appendix 2(2)(i):	A plan of study for undertaking the EIA process to be undertaken, including –	10



	<ul style="list-style-type: none"> i) A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; ii) A description of the aspects to be assessed as part of the EIA process; iii) Aspects to be assessed by specialists; iv) A description of the proposed method of assessing the environmental aspects, including a description of the proposed method assessing the environmental aspects to be assessed by specialists; v) A description of the proposed method of assessing duration and significance; vi) An indication of the stages at which the competent authority will be consulted; vii) Particulars of the public participation process that will be conducted during the EIA process; and viii) A description of the tasks that will be undertaken as part of the EIA process; ix) Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored. 	
Appendix 2(2)(j)	<p>An undertaking under oath or affirmation by the EAP in relation to –</p> <ul style="list-style-type: none"> i) The correctness of the information provided in the report; ii) The inclusion of comments and inputs from stakeholders and interested and affected parties; and iii) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; 	13
Appendix 2(2)(k):	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the EIA;	13
Appendix 2(2)(l):	Where applicable, any specific information required by the competent authority; and	N/A
Appendix 2(2)(m):	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A



1.2 DETAILS OF THE EAP

Ntshovelo Mining Resources (Pty) Ltd, a subsidiary of Mbuyelo Coal (Pty) Ltd, has appointed Geo Soil and Water cc (GSW) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the necessary authorisation and amendment processes for Vlakvarkfontein Coal Mine. In turn GSW has appointed EIMS as well as various specialist sub-consultants to assist with compiling the necessary reports and undertaking the statutory consultation processes, in support of proposed extensions to the Vlakvarkfontein Coal Mine.

GSW was founded in 2008 and has steadily grown to be a significant player in the Environmental Management Consulting industry in South Africa. GSW and its resources have been involved with many EIA projects and offers access to a broad body of knowledge and experience with the various Integrated Environmental Management tools (EIA; EMPR; EMP; SEA; EMF; etc.).

The EAP for this project is as follows:

EAP Name: Adri Joubert

SACNASP Registration Number: 400058/01

1.3 EXPERTISE OF THE EAP

1.3.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the 2014 EIA Regulations (Government Notice R. 982), an independent Environmental Assessment Practitioner (EAP), must be appointed by the applicant to manage the application. Geo Soil and Water cc (GSW) has been appointed as the Environmental Assessment Practitioner (EAP) to assist with undertaking the necessary authorisation and amendment processes for the Vlakvarkfontein Coal Mine. In turn GSW has appointed EIMS, as well as various specialist sub-consultants to assist with compiling the necessary reports and undertaking the statutory consultation processes, in support of proposed extensions to the Vlakvarkfontein Coal Mine. EIMS has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIA's;
- Comply with the NEMA, the Regulations and all other applicable legislation;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with EIAs and relevant application processes) of the consultants that were involved in the EA process and the compilation of this report are attached as Appendix A.

1.3.2 SUMMARY OF THE EAP'S PAST EXPERIENCE

GSW is a private and independent environmental management-consulting firm that was founded in 2008. GSW has significant experience in conducting EIAs, including many EIA's for mines and mining related projects. Please refer to the GSW website (www.geosoilwater.co.za) for examples.

Adri Joubert is the sole owner and project manager at GSW and has been involved in numerous significant projects over the past 20 years. She has extensive experience in Project Management as well as with undertaking EIAs and Environmental Auditing. Adri has acted as Project Manager and Quality Reviewer for several mining related projects for clients including Mashala Resources, Continental Coal and Pembani Coal Carolina. A CV is included in Appendix A.



1.3.3 SPECIALIST CONSULTANTS

Specialist studies will be undertaken to address the key issues that require further investigation, namely the impact on biodiversity, groundwater, heritage, palaeontological, soils, aquatics and wetlands, blast and vibration, air quality and health, noise, social, and closure. The specialist studies involve the gathering of data relevant to identifying and assessing environmental impacts that may occur as a result of the proposed project. These impacts will then be assessed according to pre-defined rating scales (see Section 9). The specialists will also recommend appropriate mitigation / control or optimisation measures to minimise potential negative impacts or enhance potential benefits, respectively.

2 DESCRIPTION OF THE PROPERTY

Table 3 below indicates the farm portions that fall within the Mining Right Area of the Vlakvarkfontein Coal Mine. It also contains details on the location of the mine. Table 4 states the distance to the nearest towns.

Table 3: Locality details

Locality Details			
Farm Name	Portions 5, and 18 of the Farm Vlakvarkfontein 213 IR.		
Mining Right holder	Ntshovelo Mining Resources (Pty) Ltd (Ntshovelo) a subsidiary of Mbuyelo Coal (Pty) Ltd. is the holder of an approved Mining Right (MR) in respect of the following properties within the existing Vlakvarkfontein Coal Mine:		
Application Area (Ha)	The properties within the Vlakvarkfontein Mining Right area cover approximately 845 hectares (ha). The proposed new mining area is approximately 103 hectares in size.		
Magisterial District	Nkangala District Municipality		
Distance and direction from nearest town	The Vlakvarkfontein Coal Mine The mining area is situated approximately 30km north east of Delmas, and approximately 15km south west of Ogies. The N12 highway passes to the north of the mining area. The project falls within the Victor Khanye Local Municipality. Table 4 below indicates the distances and directions of the mine to the closest towns.		
21-digit Surveyor General Code for each Portion	Farm Name:	Portion:	Title Deed
	Vlakvarkfontein 213 IR	5	T13419/2013
	Vlakvarkfontein 213 IR	18	T5731/2012

Table 4: Distance to nearest towns

Town	Distance in kilometers
Ogies	~15 km
Delmas	~30 km
Bronkhorstspuit	~30 km



A description of the Title Deeds, registered landowners, and existing authorisations for each of these properties is provided in Table 5 below.

Table 5: Property details

Farm Name	Portion	Title Deed	21 Digit General Code	Surveyor	Registered Landowner	Existing Authorisation
Vlakovarkfontein 213 IR	5	T13419/2013	TOIR00000000021300005		Ntshovelo Mining (Pty) Ltd.	Mining Right Ref No: MP 30/51/2/2/300 MR WUL Ref No.:4B20F/AGJ/113; WUL Ref. No: 03/B20A/G/4845; and WUL Ref. No: 03/B20F/AGJ/4858
Vlakovarkfontein 213 IR	18	T5731/2012	TOIR00000000021300018		Ntshovelo Mining (Pty) Ltd.	Mining Right Ref No: MP 30/51/2/2/300 MR WUL Ref. No: 03/B20F/AGJ/4845

Figure 1 and Figure 2 indicate the locality of the Vlakovarkfontein Coal Mine, as well as the mining right boundary and the proposed opencast area.

The Mining right was originally issued over Portions 5, 3 and 13 of Vlakovarkfontein 213 IR. Ntshovelo didn't buy all the land and only Portion 5, Portion 3 and a small portion of Portion 13. When Portion 3 and the small portion of portion 13 was bought it was consolidated and is now called portion 18. The mining right is now over portion 5, 18 and 13 but mining will only take place over portions 5 and 18.

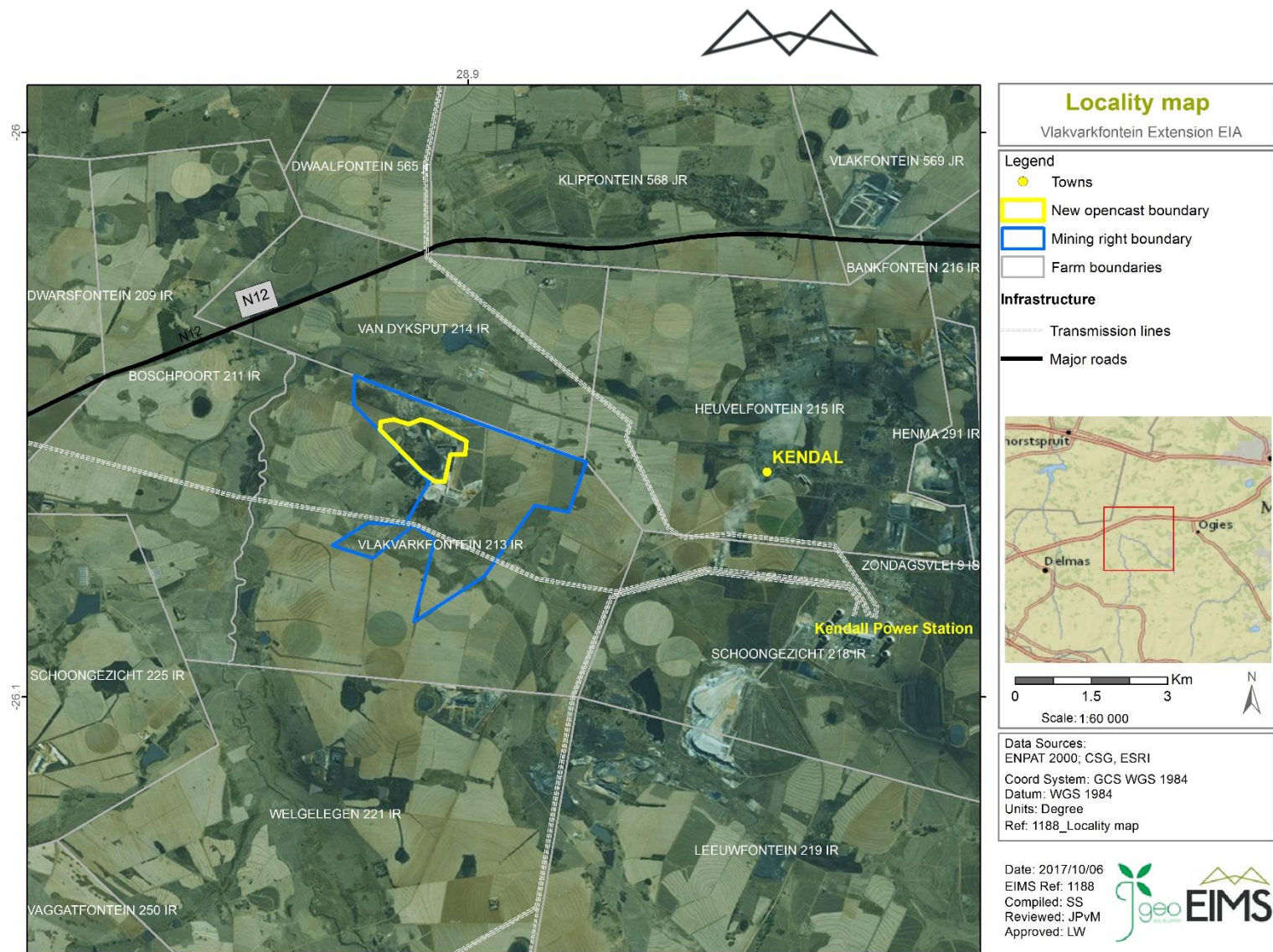


Figure 1: Aerial Imagery Locality Map indicating the mining right boundary and the proposed opencast extension area.

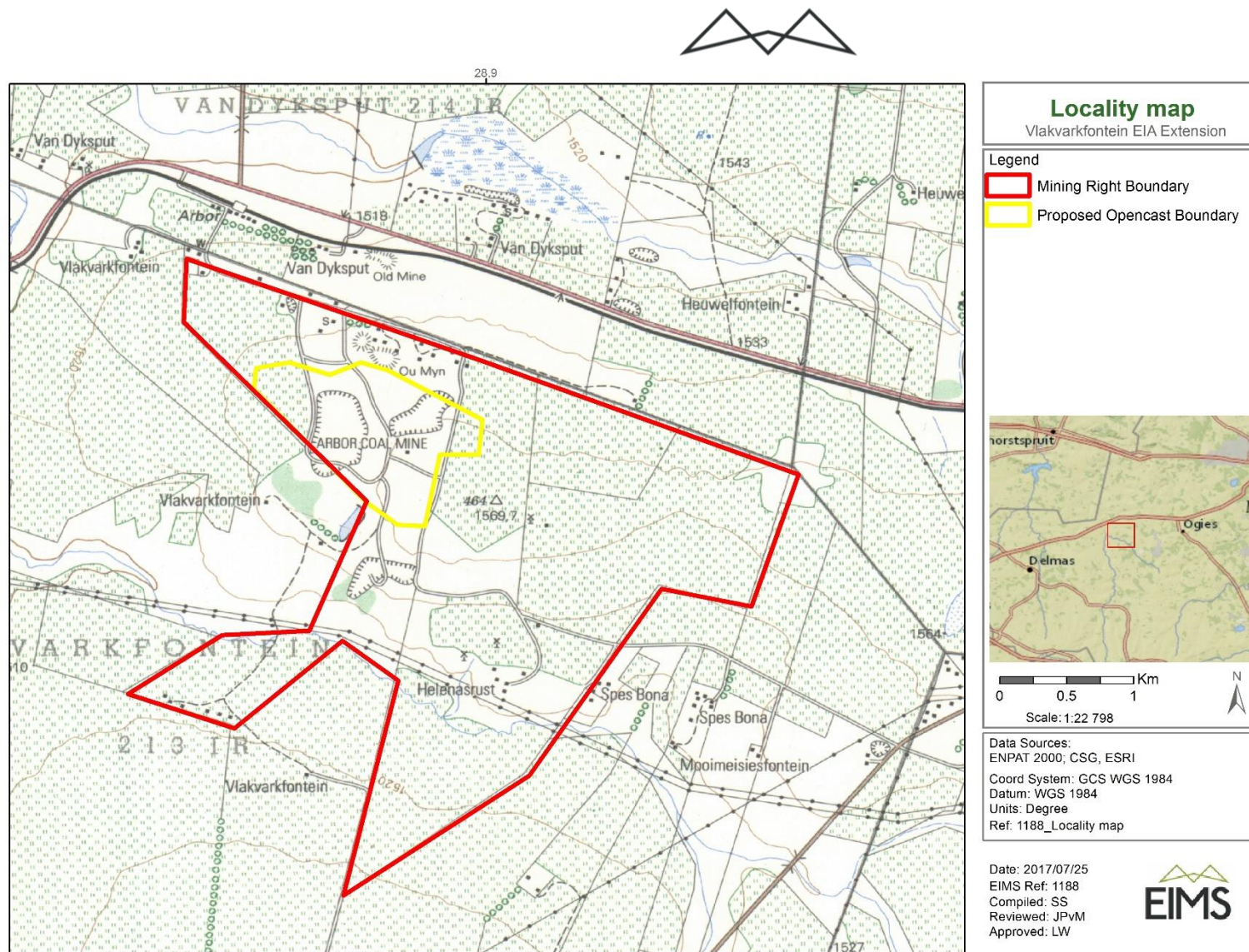


Figure 2: Topographical Locality Map indicating the mining right boundary and the proposed opencast extension area.



3 DESCRIPTION AND SCOPE OF THE PROPOSED PROJECT

The section below provides a detailed project description. Much of key information presented in this chapter was obtained from personal communication with the mine engineer for Vlakvarkfontein. The aim of the project description is to indicate the activities that are taking place at the current Vlakvarkfontein Operation and the proposed activities that will take place at the western resources expansion project. Furthermore, the detailed project description is designed to facilitate the understanding of the project related activities which result in the impacts identified and assessed, and for which management measures have been, or will be designed.

3.1 MINING OPERATIONS OVERVIEW

The Vlakvarkfontein Coal Mine currently comprises a total mining right area of 845 ha. The coal resource at the is made up of both No. 2 and No. 4 seam coal (Refer to Figure 5), which is mined via opencast pit (approximately 130 ha in extent). Coal from the No. 2 seam is mined over the entire 130 ha extent, while No. 4 seam coal is mined over approximately 90 ha within the 130 ha footprint. Mining takes place via a truck-and-shovel rollover method whereby mining and rehabilitation will be undertaken concurrently. Initial access to the coal reserves was gained through a box-cut in the centre-west of the mining area. Mining then progresses in an easterly direction from the south of the box-cut.

Figure 3 indicates the typical mining sequence and can be summarized as; initial removal of the overburden which will then be stockpiled behind the mining area to ensure it can be replaced back in the initial box cut. The physical mining of the coal seam follows which is then placed into trucks to be taken to the crushing and screening facility. From here discard coal will be extracted and replaced in the bottom of the opencast pit, while the product will be taken to the weighbridge via trucks and then removed off site. The overburden is replaced back into the pit as mining progress leaving a minimum area open at a single time. The topsoil which was stripped and stockpiled separately before mining commenced is then replaced and according to the land capability specialist report prepared to the optimal composition to ensure the field can be restored to grazing land as was the pre-mining land use

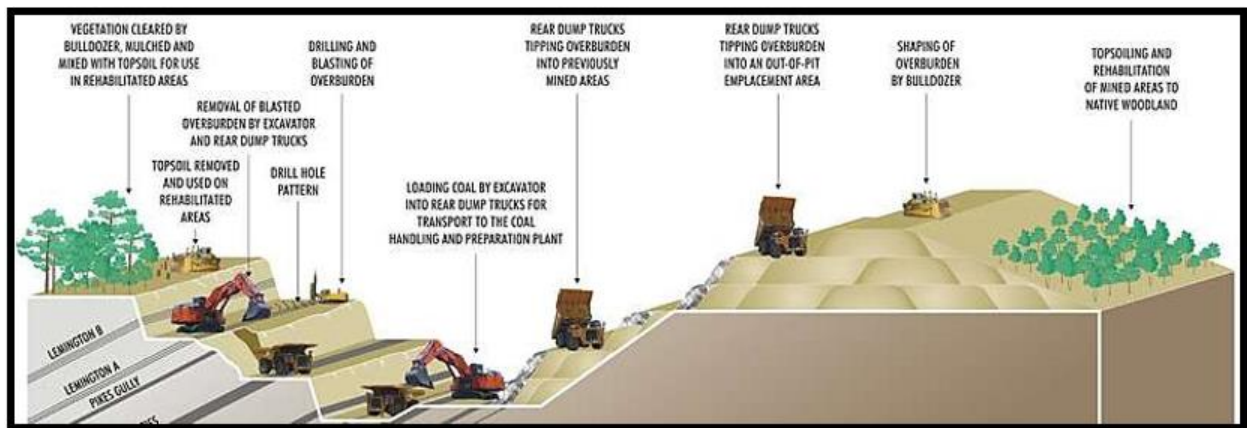


Figure 3: Typical coal surface mining opencast sequence indicating rollover backfill rehabilitation methodology (Eco-Elementum, 2014)

Coal from the No. 2 seam is removed, followed by the carbonaceous interburden. The No. 4 seam is then mined, leaving an excavation which is backfilled as mining progresses to the next strip. Overburden and interburden are excavated from each progressive strip and deposited into the excavation left by the previous strip “rollover”. Interburden will be deposited first, followed by overburden. It took approximately 10 months for the first strip to be mined completely when mining started in 2010, by which time stripping and mining had progressed to the following two west-east cuts to the south of the first cut. Mining in this way effectively divides the pit into a northern and southern section. Only once the most southerly point of the open pit has been reached, will mining continue in a northerly direction from the centre-west point.

Vlakvarkfontein coal mine is planning to extend their opencast mining area to include an additional ~100 hectares within the existing mining right boundary. As such a S102 amendment process is being undertaken by



the mine, as well an EA process, including an EIA to assess any new impacts associated with the change in the extent of the approved mining area, and to consolidate the numerous authorisation processes that have been undertaken to date to produce a single overarching EMPR for holistic management of the Vlakvarkfontein Coal Mine going forward. The existing rights, authorisations and approvals currently in place and considered in the compilation of the report and listed in Table 6 below.

Table 6: List of current authorizations

Legislative provision under which granted:	Reference #:	Activities approved:	Applicable properties:
EMPr approval – S23 of MPRDA	MP 30/5/1/2/2/300	Coal Mining	Vlakvarkfontein 213 portions 3, 5 and 13
Mining Right - S23 of MPRDA	MP 30/5/1/2/2/300 MR	Coal Mining	Vlakvarkfontein 213 portions 3, 5 and 13
IWUL application - NWA	File No. 16/2/7/B100/C249, Licence No. 4/B20F/AGJ/1131;	21(a), 21 (g) and 21(j)	Vlakvarkfontein 213 portions 3, 5 and 13
IWUL amendment - NWA	File No. 16/2/7/B100/C249, Licence No. 03/B20A/G/4845	21 (g) – addition of PCD	Vlakvarkfontein 213 portions 3, 5 and 18
IWUL amendment - NWA	File No. 16/2/7/B100/C249 Licence No. 03/B20F/AGJ/4858	21(a), 21 (g) and 21(j) – amendment of conditions	Vlakvarkfontein 213 portions 3, 5 and 13

The existing infrastructure at the Vlakvarkfontein Colliery consists of the following:

- Opencast pit;
- Stockpiles;
- Offices;
- Beneficiation infrastructure;
- Contractors yard;
- Weighbridge;
- Access and haul roads;
- Security point and fencing;
- Pumps and sumps;
- Clean water trenches;
- Dirty water trenches;
- Pollution control dam; and
- Storm water control trenches.

A current infrastructure map is indicated in Figure 4.

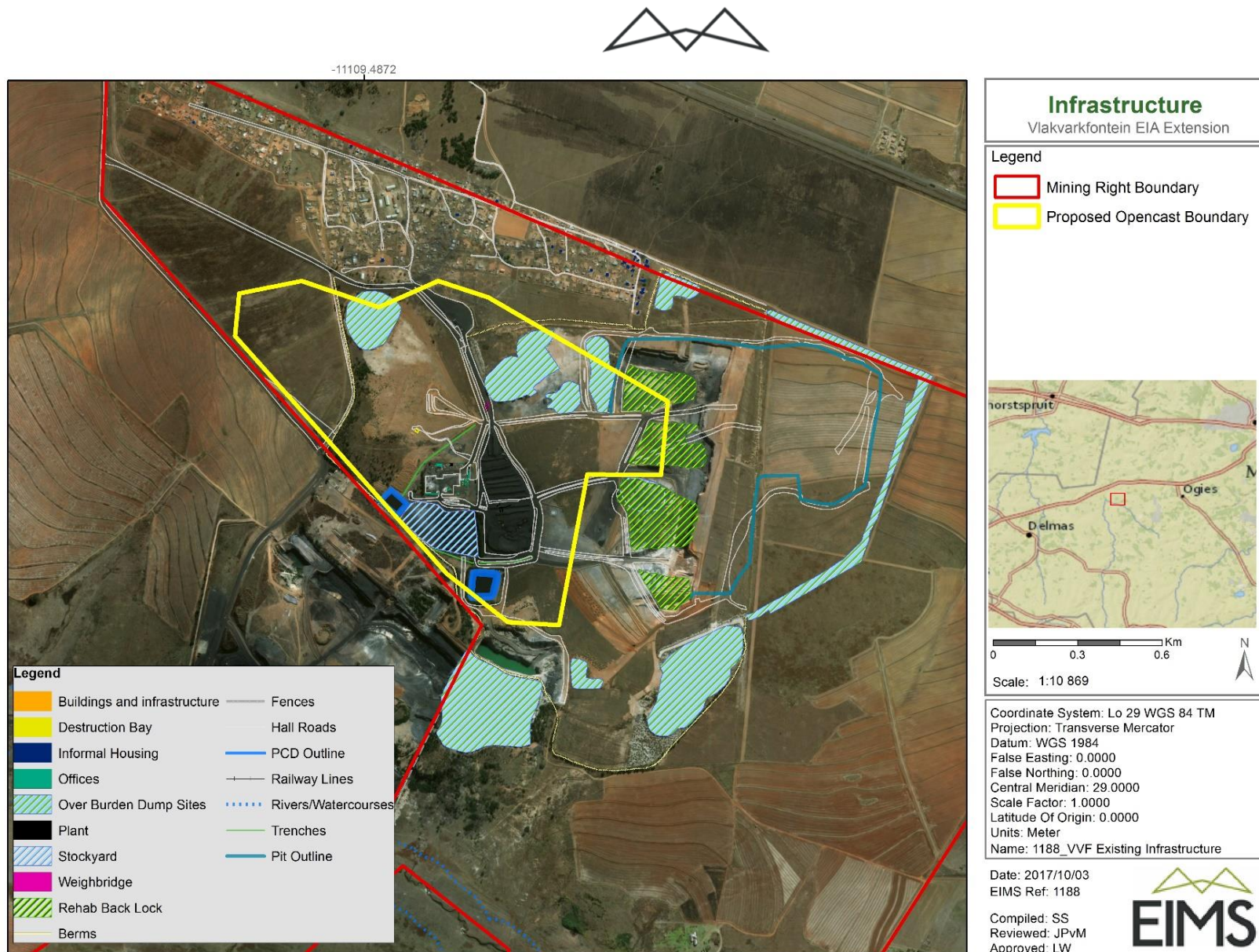


Figure 4: Current infrastructure map



3.2 DESCRIPTION OF ACTIVITIES TO BE UNDERTAKEN

It is the intention of this Scoping Report to provide the necessary information regarding the changes with regards to the amendment of the existing MWP to include additional opencast mining of coal resources at the Vlakvarkfontein Coal Mine. The proposed amendment to the MWP (within the existing mining right) includes opencast mining on Portion 5 of the farm Vlakvarkfontein 213 IR.

3.2.1 THE MINERAL RESOURCES

The Vlakvarkfontein coal deposit consists of an isolated basin surrounded and underlain by basement rocks, which are in turn overlain by Carboniferous Dwyka Group tillites and the coal bearing Vryheid Formation of Permian age. The seams attenuate and pinch out against the elevated basement rocks along the basin surrounded by basement rocks along the basin margins.

Vlakvarkfontein does not host the complete sequence of the Witbank Coalfield coal seams, and only the No.2 and No.4 seams are well-developed and of economic interest. In places, a thin (often less than 10cm) No.3 Seam is present, but this acts as more of a stratigraphic marker than coal resource. The No.5 Seam does not occur at all having been eroded away. The stratigraphy of Vlakvarkfontein can be subdivided into two main sequences, these being a basal No.2 Seam Sequence, overlain by the No.4 Seam Sequence.

No faults or dolerites were intersected during exploration, although a couple of small dolerites were intersected during mining since 2010. The original resource block delineated represents the shallow opencast mineable coal lying immediately to the south and east of the defunct Arken Coal Mine Underground workings. Further drilling added more confidence to the resources, and in 2016 some drilling was done in the old workings as well as west of the old workings. A full updated resource statement was not issued but the geological models were updated on a regular basis from where the mine designs were updated and extended as per the coal resources in the model.

A decision was made to mine the old underground workings, as well as resources to the west, up to the point where the 2 seam sub-outcrops against the basement rocks. Refer to Figure 5 below, which indicates the atypical stratigraphic column of the two seams occurring below.

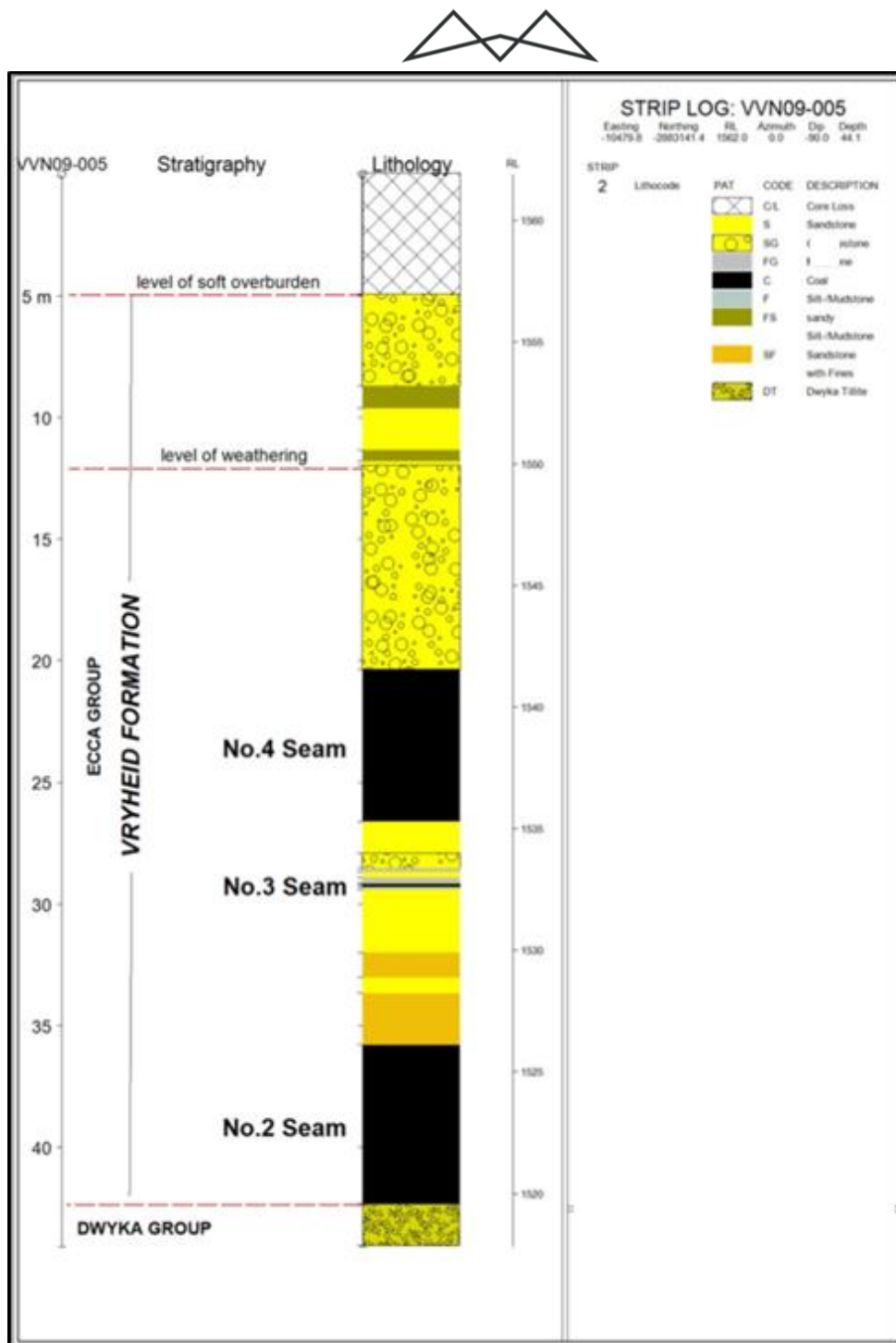


Figure 5: Typical Stratigraphic Column at the deepest part of the resource.

3.2.2 MINING METHOD TO BE EMPLOYED

The 2 and 4 seams are both up to 6m in thickness with a maximum depth of 40m. The maximum stripping ratio (bulk cubic meters of waste rock to be removed to recover one tonne of coal) for this resource/reserve is less than 3:1 which make this an ideal opencast mining operation. The remaining resources are too shallow to mine by means of underground mining methods and even the old underground pillars will be mined by means of the same roll over opencast mining method. Economical opencast coal mining for this Vlakvarkfontein quality of coal can be done up to a stripping ratio of almost 6:1.



3.2.3 OPENCAST MINING

Vlaskfontein Coal mine produced its first coal on 27 May 2010. Operations started approximately 50-100m east of the old underground workings with a north-south box-cut and advanced to the east. This portion or section of the mine was planned and indicated in the previous MWP and original Mining Right Application. Very few resources are left in this section of the mine and it will be fully depleted in 2019. Rehabilitation of this area is concurrent and up to date. The more challenging resources in the old underground mine and the little bit to the west was only explored and decided to be proposed for mining in 2016. The current open pit is shown in Figure 6.

The proposed mining will start with a north-south box-cut in the west where the 2 seam sub-outcrop occurs. Mining will progress in strips towards the east and eventually intersect the underground pillars (Figure 7 and Figure 8). Mining will continue through the old underground pillars and eventually through the barrier pillar that was left between the old underground section and the original opencast workings. The new open-cast operation will be initiated by the stripping of topsoil to expose the overburden of the proposed box-cut. The topsoil, subsoil, hards and carbonaceous hards will be hauled to a designated area and act as a berm between the community and the mine. All material types to be used for rehabilitation at a later stage and stockpiled separately to avoid mixing of material types. The anticipated strip ratio for the new open cast section is estimated at 1.75:1.

Once the topsoil is removed and stored appropriately, the overburden of the proposed box-cut is then drilled, blasted and removed to mine benches approximately 40 m wide and down to the 2 seams. There is no 4 seam coal, where the box-cut will start in the west as it has been eroded away. The monthly estimated production rate of the open-cast is estimated at 100-140ktpm. Refer to Table 7 below, which indicates the production schedules.

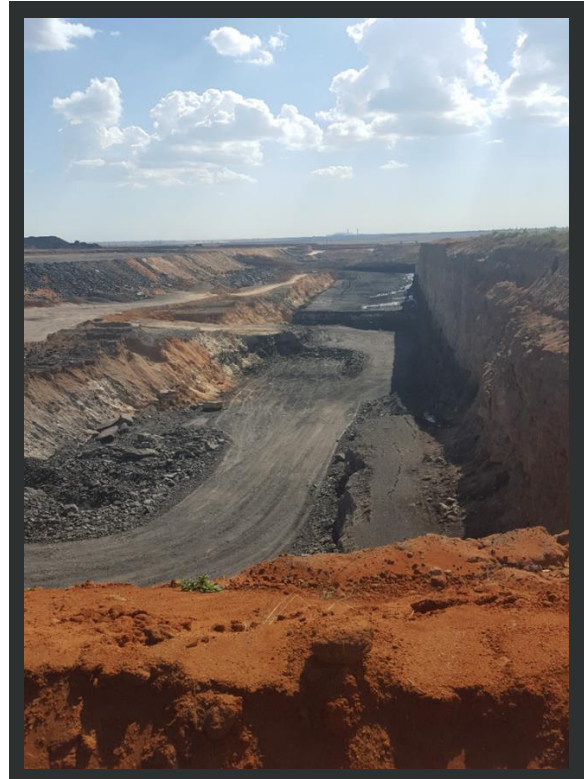


Figure 6: Current open cast pit.

A new coal processing facility will be built where the non-select coal as well as the coal mined in the old underground pillars will be washed to get rid of the contamination to produce a saleable ESKOM product.

3.2.4 MINE PRODUCTION RATE

Vlaskfontein Coal mine is an operating opencast coal mine practising a drill and blast, load and haul mining method with concurrent roll over rehabilitation. This mine has been in operation since early 2010 and is selling the select seams on a RAW crush and screen basis to ESKOM at a rate of 100ktpm – 140ktpm to be used in some of their power stations. The non-select lower quality coal is currently sold on a cost recovery basis.

3.2.4.1 MINE SCHEDULE

Proposed mining operations in the west are scheduled to commence if, and when, all necessary environmental and other authorisations and licenses have been granted. The current production schedule is such that while production is tapering down in the current eastern operation it will ramp up in the western operation to maintain a consistent product delivery to ESKOM.

The production schedule is presented in the table below, this indicate all material types and coal seams to be mined.



Table 7: Life of Mine (LOM) Production Schedule - All Material Types and Coal

PRODUCTION WEST & EAST	Unit	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	TOTAL
TOPSOIL	bcm	23 523	21 853	267 956	217 553	144 459	105 497	68 737	-	849 578
SOFTS	bcm	114 733	176 064	1 426 536	1 101 710	841 368	908 844	740 118	-	5 309 374
HARDS	bcm	947 649	1 387 567	840 769	1 097 423	1 423 833	1 395 319	914 183	-	8 006 742
S4N COAL	romt	110 289	41 826	-	23 784	63 936	167 173	143 039	-	550 046
S4S COAL	romt	295 248	224 340	-	89 086	115 228	401 913	356 248	-	1 482 063
S4PIL COAL	romt	-	-	-	348 964	468 533	56 407	-	-	873 904
S2 PARTING	bcm	990 021	1 525 892	685 064	1 208 343	878 735	775 311	1 075 590	62 156	7 201 112
S2S COAL	romt	644 752	1 142 064	1 112 123	373 651	185 625	391 387	604 625	342 809	4 797 035
S2N COAL	romt	-	-	573 695	127 859	45 744	145 716	117 807	69 797	1 080 618
S2PIL COAL	romt	-	-	147 876	1 048 300	1 270 614	806 293	164 127	3 592	3 440 801
TOTAL WASTE	bcm	2 075 926	3 111 376	3 220 326	3 625 028	3 288 395	3 184 971	2 798 628	62 156	21 366 807
TOTAL COAL	romt	1 050 289	1 408 230	1 833 694	2 011 643	2 149 679	1 968 889	1 385 846	416 197	12 224 467
TOTAL STRIP RATIO	bcm/romt	1,98	2,21	1,76	1,80	1,53	1,62	2,02	0,15	1,75

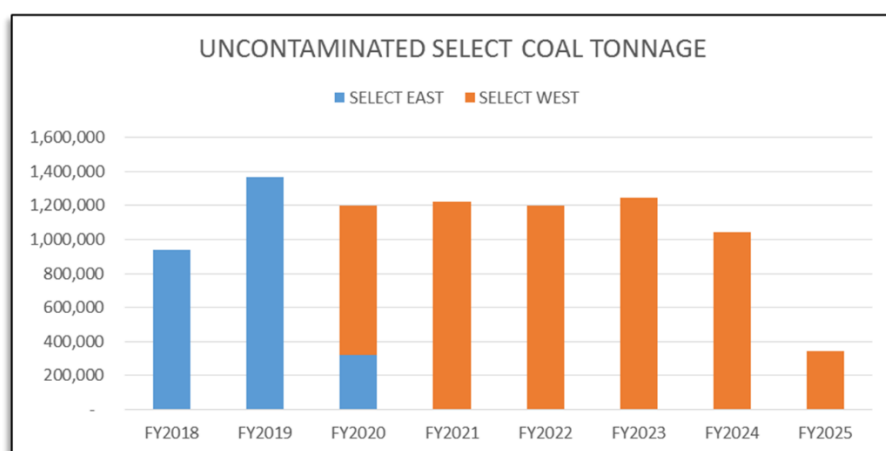


Figure 7: Production Taper-Down in East and Ramp-Up in west of Select Coal seams.

3.2.4.2 MINERALS PROCESSING

Only the select seams from the eastern resource are sold on a crushed and screened RAW basis to ESKOM. A jaw crushing plant is currently used for this processing where 100% of the select seams are sold.

A new processing facility Coal Handling and Processing Plant (CHPP) will be built for the proposed western resource to be mined. All ROM coal will be crushed to 110mm in a rotary breaker where some of the large pieces of stone will be separated. Select coal seams (<110mm) will only go through a secondary crusher after the rotary breaker and then to the product stockpiles. All contaminated coal and non-select seams will go through a Dense Medium Cyclone (DMS) cyclone washing plant where the stone will be separated from the coal. The wash plant product will be blended in with the select product that was only crushed, to meet the quality specification of Eskom. The coarse waste will be dumped either on a discard dump on surface or in the open cast pit if permission is obtained from the relevant authorities. The fines from the wash plant will be dried in a filter press, and depending on the qualities, the filter cake may either be blended with the product, or also disposed of on the discard dump. Refer to the flow diagram presented in Figure 10, which indicates the proposed coal process.

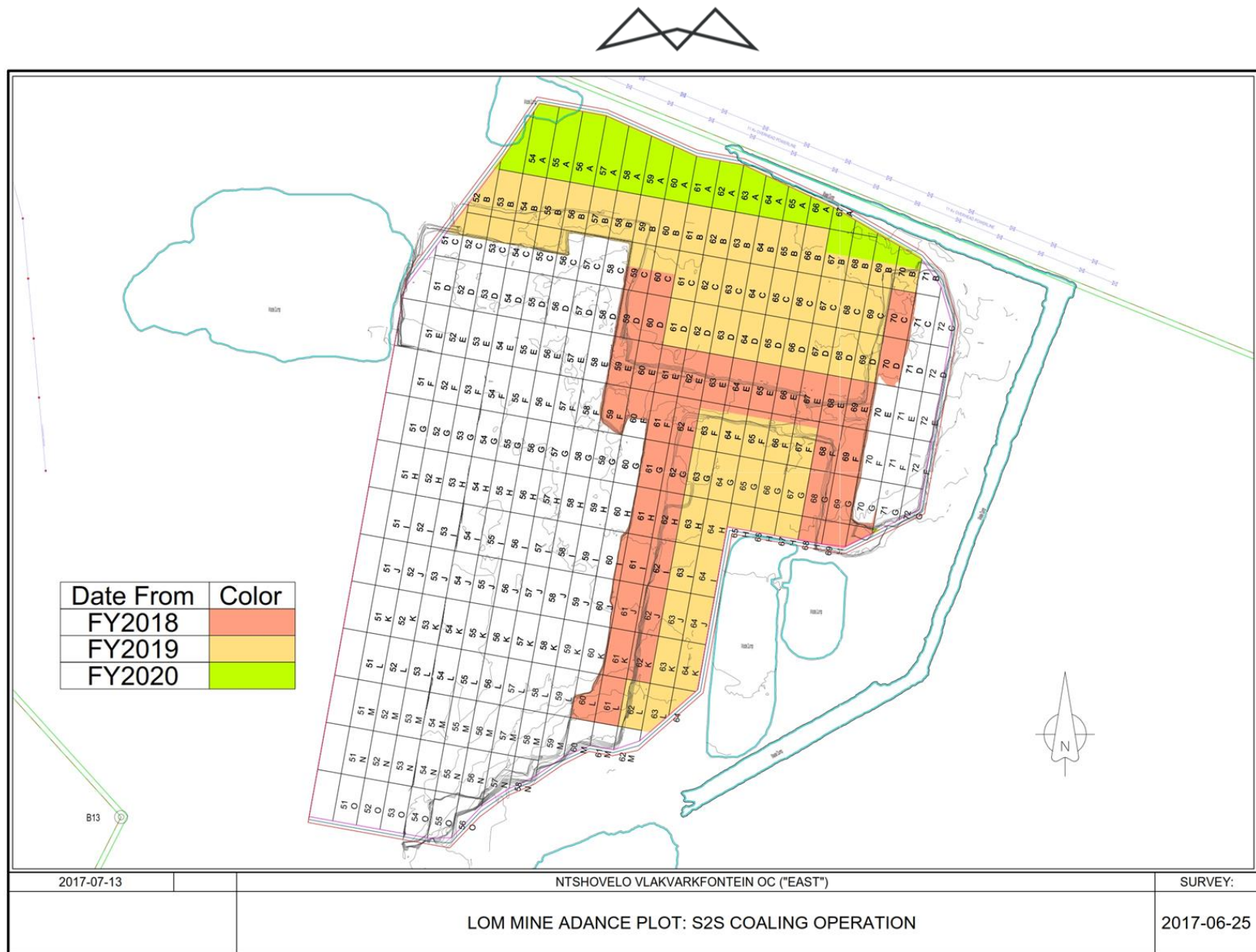


Figure 8: Two Seam Select (Bottom seam) progress plot for LOM in Current Eastern Opencast Operation

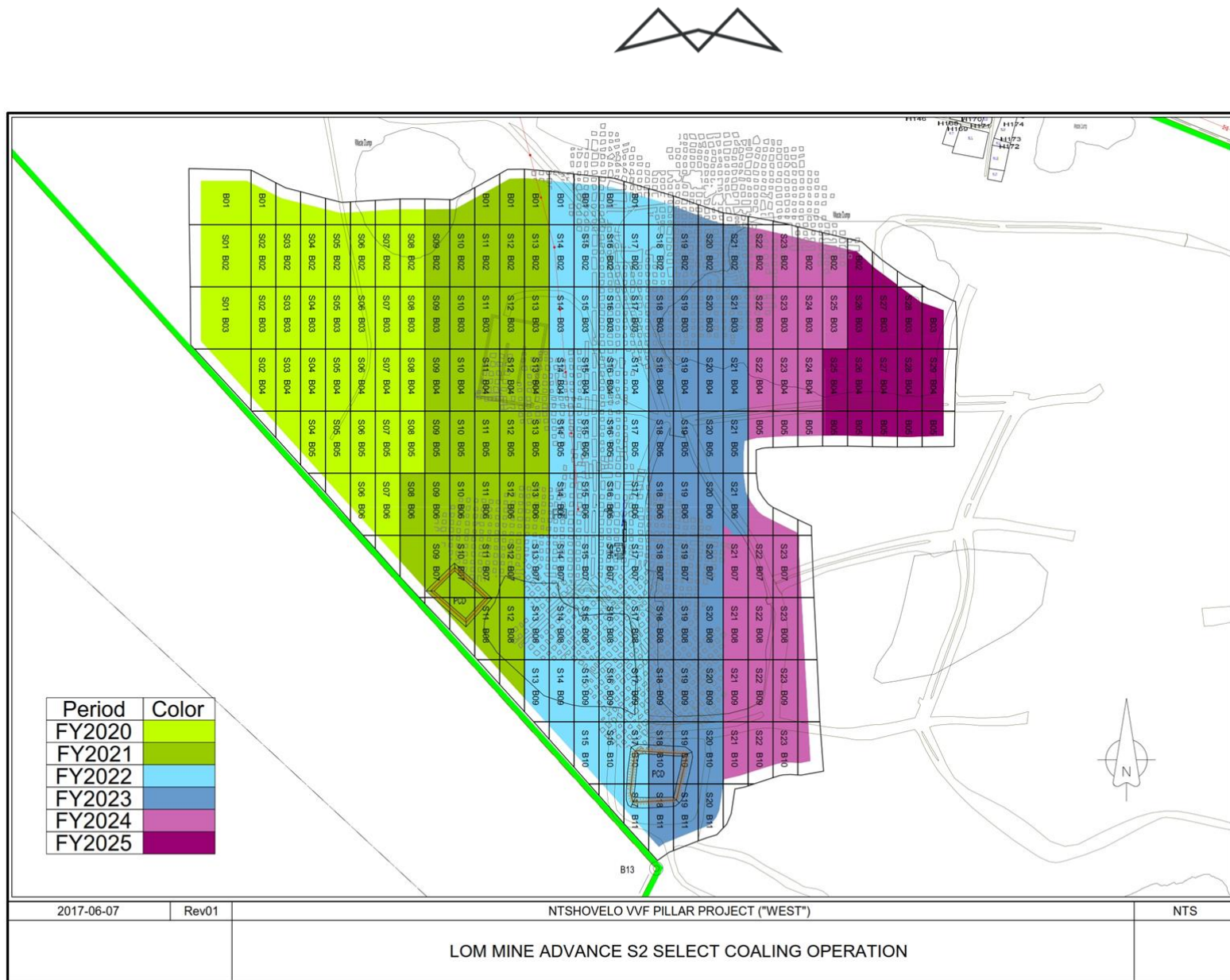


Figure 9: Two Seam – Select and Non-Select (Bottom seam) progress plot for LOM in Proposed Western Opencast Operation



Figure 10: Four Seam – Select and Non-Select progress plot for LOM in Proposed Western Opencast Operation

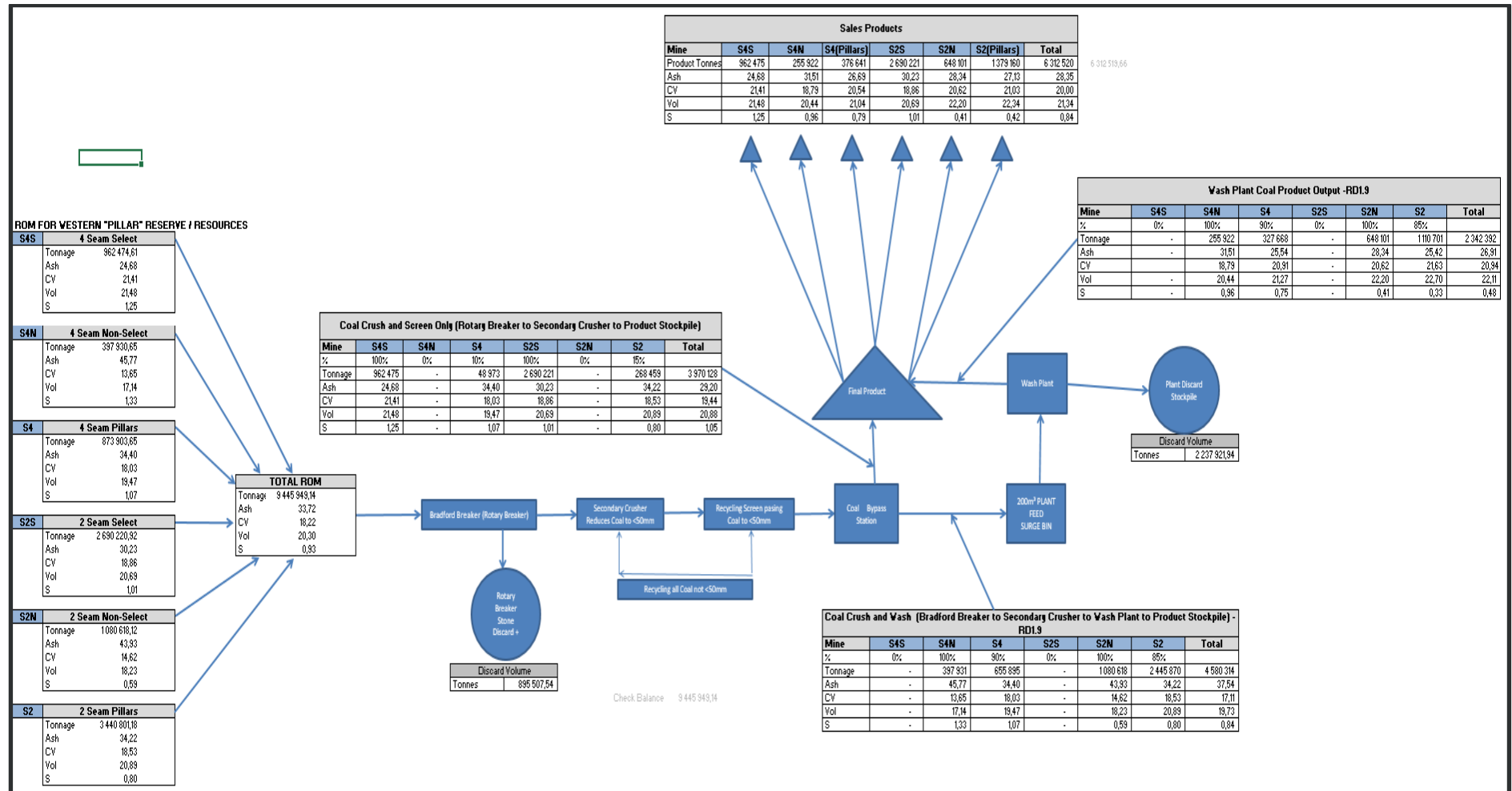


Figure 11: Process Flow Diagram for coal handling and preparation plant (CHPP) of the proposed Western Resource



3.2.5 STOCKPILES

3.2.5.1 RUN OF MINE STOCKPILES

Coal mined in the opencast operation will be placed on the run of mine (RoM) stockpiles in front of the current crushing plant while mining is still taking place in the east. Coal will be placed in front of the rotary breaker if not tipped directly into the ROM tip when the new plant is built as part of the western resource project.

The crushed and screened coal, as well as the washed product will be blended onto 3000t - 5000t ESKOM stockpiles whilst awaiting laboratory results. On approval, the product will be transported to various ESKOM power stations. Vlakvarkfontein "east" is almost mined out and the new CHPP (processing plant) to be relocated run of mine stockpiles as well as product stockpiles and new coarse discard dump (if discard is not allowed to be dumped into the pit) will be within a bunded or trenched areas on top of the previous mined but rehabilitated Vlakvarkfontein "east" area and all contaminated water will be free draining initially to a transfer sump from where the dirty water will be pumped to the current PCD (Figure 12) and later will be free drained into a new PCD where it will form part of the water recycled between the CHPP, water treatment plant and used for dust suppression on the haul roads. The pollution control sump will be a temporary measure and the dirty water will be pumped from here to the current PCD dam until we have to demolish the old PCD dam due to mining and a new PCD dam is being built.



Figure 12: Current PCD at Vlakvarkfontein

3.2.5.2 NON-CARBONACEOUS STOCKPILES

Overburden stockpiles comprising of both hards and softs will be stockpiled in a long stockpile between the community in the north, and the western resource mining area. The size of this berm will be minimised to enable optimal rehabilitation of the east and to minimise double handling. The berm will be 8-10m high with a 30-40m base. The first portion of the berm (from the west) will be on the southern side of the road and then after it passes the current access road it will be located on the northern side of the road. The berm will only be built during the box cut phase and during the first year then roll over will continue.



3.2.5.3 SOIL STOCKPILES

Stripped soils – top soil and sub soil will be stockpiled separately. This will ensure that the characteristics of soil stockpiles are suitable for the prevailing landscape and drainage conditions once they are replaced during rehabilitation. All topsoil stockpiles will also be placed between the community and the western resource mining area where practical which will provide free drainage in all directions and added safety from erosion concerns. Topsoil stockpiles will also be placed in areas far removed from mining activities where they will not be accidentally impacted on or where they will need to be frequently moved.

3.2.6 WASTE

Hazardous, industrial and general or domestic waste forms part of the waste stream generated at the Vlakvarkfontein Coal Mine. Non-hazardous domestic and industrial waste comprise of typical constituents such as paper, empty cans, glass, steel and plastic containers, scrap metal, piping and tubing (plastic, metal and rubber). However, the majority of non-residue industrial waste produced on site is hazardous. This includes used oil, degreasers, lubricants and containers, mostly contaminated. The volumes applicable to the identified waste stream will fluctuate with the requirements of the mine, but the mine has committed to not dispose of any waste on site. All waste streams will be temporarily stored on site until they are removed by an appointed waste contractor. The mine has committed to ensuring the following waste storage thresholds are adhered to:

- No more than 99 m³ of general (domestic, non-hazardous) waste will be stored on site at any one time; and
- No more than 34 m³ of industrial (hazardous) waste will be stored on site at any one time.

3.2.7 MINE RESIDUE

Mine residue (slurry and discard) will be generated at the proposed wash plant area. Slurry will be routed to a filter press, where the slurry will be dried to a filter cake before being added to the saleable product. During emergencies and maintenance, the slurry will be put into the discard dump or pumped back into the pit. Discard will be disposed of either back into the pit on the site or into a discard dump. Current calculations indicate that discard tonnages will average 542 091 tons per year for the first three years of operation and 203 883 tons per year for the next three years.

3.2.8 ADMINISTRATION BUILDINGS, WORKSHOPS AND OTHER BUILDINGS

Most of the current mining infrastructure will have to be moved during or just after 2021 due to the western reserve mining coming within the 500m blasting radius - normally the minimum safety area to be cleared during blasting. The legal requirements are covered by various acts such as the Explosives Act and the Mine Health and Safety Act. The only immediate new infrastructure required is the wash plant and perhaps the coarse discard dump with dirty water management systems and water treatment plant for the de-watering of the old underground workings. The mine and contractor's offices, contractors hard-park and diesel storage facilities, weighbridges and new PCD dam will be relocated when the western mining operations become dangerously close to the infrastructure.

As such, the infrastructure immediately required is listed below:

- CHPP;
- Coarse Discard Dump if not approved to dump plant discard back into pit
- Temporary pollution control sump;
- Storm water management including clean and dirty water separation systems;
- Access and haul roads – slight changes;



- Water treatment plant;
- Pipelines;
- RoM Stockpiles; and
- Product stockpile area.

The infrastructure that will be relocated include:

- Weighbridges;
- Diesel storage;
- Hard park and workshops;
- Wash bay and oil trap;
- Mobile offices for mine, plant and contractor;
- Mobile ablution block;
- Contractors workshops and stores;
- Modular sewage treatment plant & prefabricated water purification plant;
- Temporary general waste storage area;
- Road truck waiting area with tarpaulin fitting area; and
- Mine access and security gates and fences.

The surface infrastructure to be utilised by the mine will mostly be prefabricated and easily portable. Where relevant, further information related surface infrastructure requirements is provided in detail below.

3.2.8.1 ADMINISTRATION BUILDINGS, ENGINEERING BAYS, WORKSHOPS AND OTHER BUILDINGS

Vlakovarkfontein coal mine is an operating mine with a “Kwik Space” type mobile office block and ablutions facility shared by the mining contractor, crushing plant contractor and the mine. The mobile office block will serve as the base of operations for coordinating the mining operation and the ablution block will serve as a change room and ablution facility for employees. All of this will be relocated in about four years in 2021 / 2022. The mining contractor erected its own workshops and spares containers, which can also be relocated with little effort or cost.

3.2.8.2 HAZARDOUS GOODS STORAGE

Diesel storage is probably the biggest non-residue hazardous material on site and it is properly bunded according to regulatory requirements. Explosives are delivered as and when required from offsite locations. Oils and other lubricants and/or chemicals are also stored in approved bunded areas. The relevant Health and Safety Standards for the handling and storage of these goods will be strictly adhered to.

3.2.8.3 WATER TREATMENT PLANT

A water treatment plant will be constructed and operated in the south of the property from where water will be released in a controlled and monitored manner back into the nearby Klipspruit stream. The majority of the water to be treated will originate from the dewatering of the current flooded old underground workings. Raw water from the old underground workings and excess water, if any from the PCD, will be pumped to the treatment plant where it will be treated to an acceptable standard to be released into the stream. A percentage of the water may be pumped



to the second stage of the treatment plant unit where it will be treated to potable standards and used for drinking water purposes.

3.2.8.4 MODULAR SEWERAGE TREATMENT PLANT

A similar sewerage handle/treatment facility will be constructed when the current offices are relocated to the east of the property in later years. Further detail will be provided in the EIA phase.

3.2.8.5 OIL AND WATER SEPARATOR

The current oil and water separators at the wash bay will be relocated with the offices and workshops and wash bay in 2021 / 2022.

3.2.8.6 WASHBAY

A wash bay that utilises a high pressure washer and complete with effluent separation, silt trap, as well as an oil and water separation system will be relocated to the new designated site in 2021 / 2022. All effluent will be collected in a sediment trap and effluent separation system to allow for the efficient collection of fines and solids as well as hydrocarbon separation.

3.2.8.7 WEIGHBRIDGE

A double weighbridge is currently in operation between the product stockpiles and the security gate. This weighbridge will need to be relocated in order for it to be close to the new product stockpile area in 2021 / 2022.

3.2.8.8 SITE ACCESS AND CONTROL

Access to the mine is controlled through a single entrance and exit point onto the mining area. 1.8 m High razor diamond-mesh fencing is utilised to ring fence the operational area including water dams. Strict access control is employed to optimise control over the flow of contractors and mine personnel to the operations area as well as product out of the mine. All visitors to mine are required to sign in at the security checkpoint located and the entrance gate and to go straight to the offices where a mine or contractor member of the personnel will have to be met on a pre-arranged arrangement. A third-party security company shall be utilised to ensure site access control. The access point will have to relocate to the east when the offices relocate.

3.2.9 HAUL ROADS

The planned haul road network for the proposed Vlakvarkfontein Extension Project can be seen on the Mining and Surface Infrastructure Plan in.

3.2.10 WATER SUPPLY

The Vlakvarkfontein Coal Mine will continue to require water in the form of both potable and bulk water for the wash plant and dust suppression. This section describes the current and proposed water uses for at mine.

3.2.10.1 POTABLE WATER SUPPLY

Potable water supply to the Vlakvarkfontein Coal Mine is obtained via an existing borehole. The borehole is located on Portion 5 of the farm. Potable water will continue to be obtained from boreholes and from the water treated at the water treatment plant, if required. As such, potable water will be made available for the required 300 people on site at a rate of ~50 litres per day per person.

3.2.10.2 PROCESS WATER

Water will be recycled onsite as far as possible. The mine extension will include a proposed water treatment plant. The Vlakvarkfontein mine requires a fair amount of water for dust suppression and for the processing plant. Process water needs can be supplied directly from the pit or PCD and subject to applicable water use licences may be used for dust suppression. An offtake (Gooseneck) facility will be situated at the PCD dam. Water from the water



treatment plant or from the PCD dam will be pumped to the processing plant's process water tank from where it will be utilised. Process water will be further used for wash bay consumption.

An updated water balance will be included in the EIAR and EMPR, which will indicate the amount of water for dust suppression, the proposed plant, and the washbay.

3.2.11 CLEAN AND DIRTY WATER PROCESSING

The management of clean and dirty water systems is governed and control extensively in the requirements of GN704 - Protection of Water Resources. Management of clean and dirty water systems is required for effective pollution control. Pollution control will be maximised through facilitating the following:

- Controlling run-off and seepage entering the mining area;
- Controlling run-off emanating from stockpiles; and
- Controlling and separating the mixing of clean water and polluted water which is contained in the PCD.

Clean and dirty areas have been determined and mapped out based on topography of the planned mine surface infrastructure. The entire mining area has been demarcated as a dirty area and the area to the south and east is demarcated as clean water.

The location of the proposed berms/trenches is included in the mine layout to contain dirty water within the dirty areas and divert clean storm water away to clean areas and eventually to the streams around the mine. Due to the location of the mine on a topographical high, it is relatively easy to divert clean water and to catch dirty water. The proposed infrastructure is indicated in Figure 11 below.

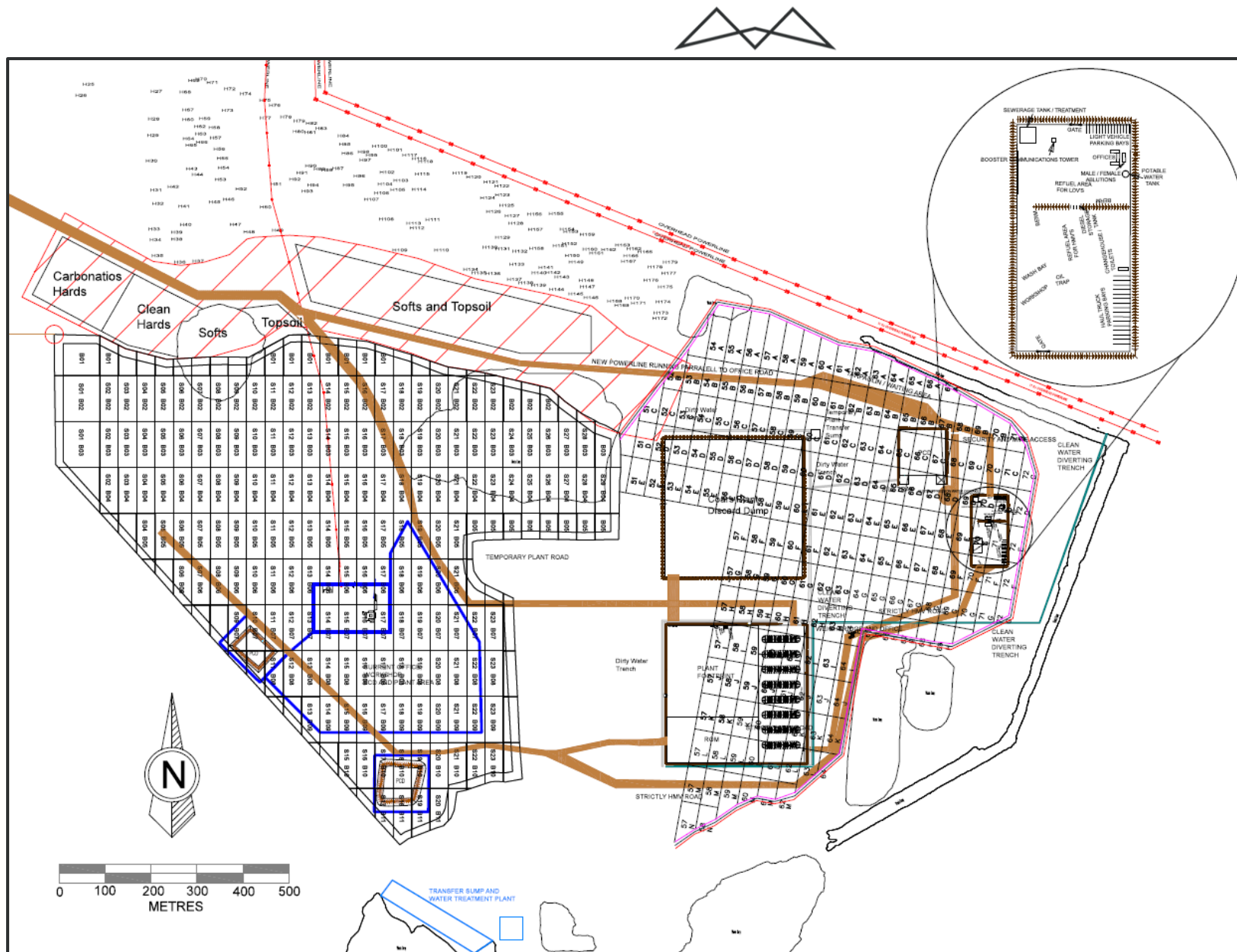


Figure 13: Proposed infrastructure (blue current and others new)



3.2.11.1 CLEAN WATER PROCESS

Earth berms and cut-off drains are constructed around the open pit excavations to divert all the clean uncontaminated water around the mining area and back into the natural streams. Water from this area will remain uncontaminated and can flow freely to the neighbouring area. This water is separated from the contaminated water from the workshop or from any processes that has a potential of contaminating water.

3.2.11.2 SUMPS AND PUMPS

The sump can also constitute a possible long-term/post-mining water management option; where mine water is pumped from the rehabilitated backfill to reduce seepage to the south.

3.2.11.3 POLLUTION CONTROL DAMS AND ASSOCIATED DIRTY WATER MANAGEMENT

Vlakovarkfontein coal mine has two pollution control dams located on the farm Vlakovarkfontein 213 IR. Both PCD's are licenced in terms of the NWA. Due to the proposed mining extension, these PCD's will be mined out. A single lined PCD will, therefore, also be constructed to manage the dirty water runoff and ingress into the pits/workings for the proposed expansions. The details of the new PCD will be included in the storm water management plan that will be available for the EIA phase. The proposed position of this PCD is indicated in Figure 12 below. The mine is, therefore, required to apply for a Water Use Licence (WUL) for the proposed PCD that will be constructed onsite. The mine has an existing storm water management plan that was designed by Greene Consulting Engineers. The storm water management plan is to be updated for the proposed extension of the mining area, and will be included in the EIAR.

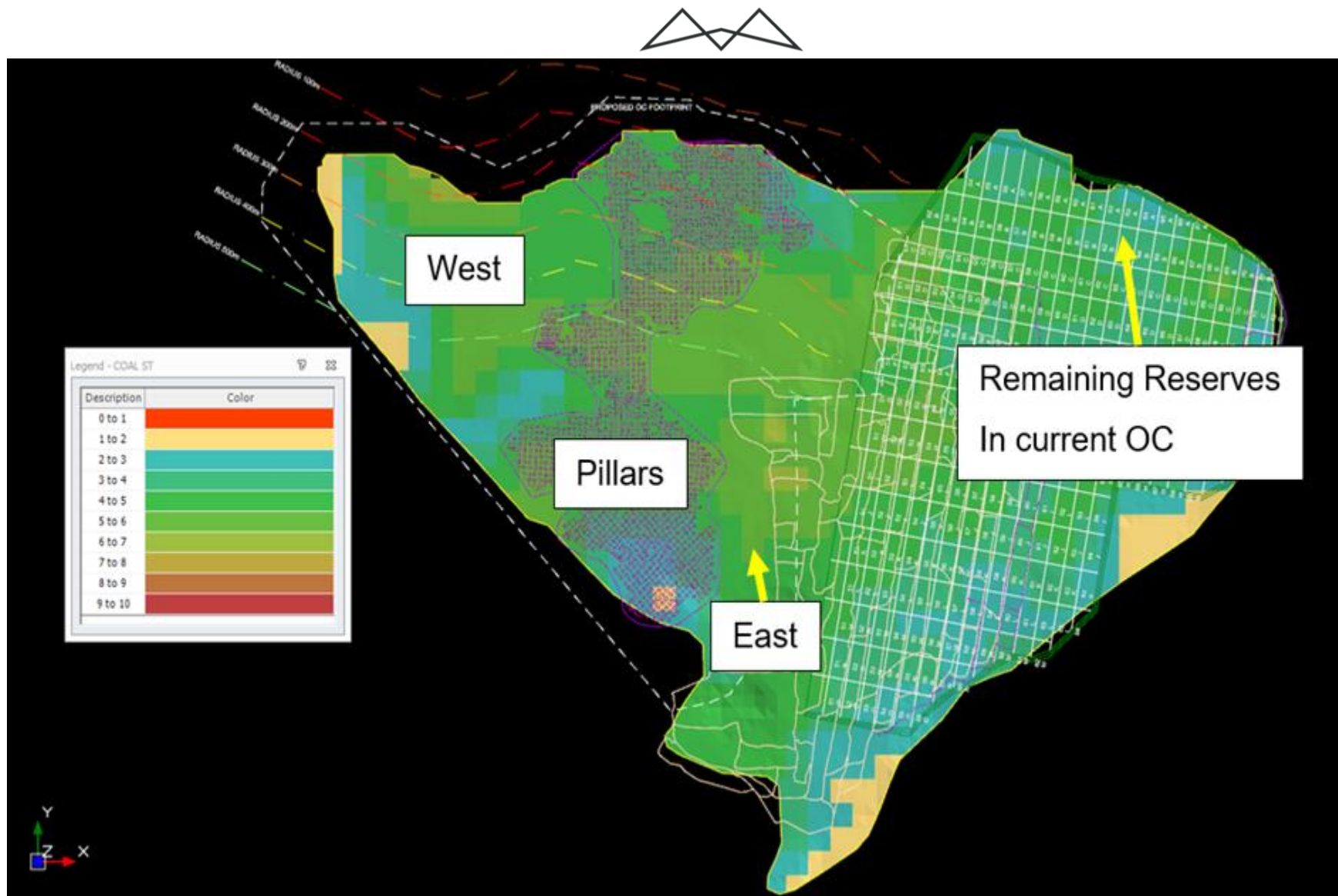


Figure 14: Location and aerial extent of proposed operations.



3.2.12 BULK POWER SUPPLY

The current “farm line” that supplies the offices and workshops with power will be rerouted to service the new offices and workshops to be constructed/relocated in the east. There is no power supply close by with sufficient capacity to supply the new CHPP, which will require in the order of a 2MVA connection. It is envisaged that diesel generators will be used unless a supply from a couple of km’s south of the mine can be secured in time. A dedicated substation will be required if an ESKOM connection can be secured. The connection point, substation and routes will be determined after further investigations are undertaken and concluded. The environmental assessment and associated permitting processes for a powerline connection and substation is not included in this EIA, and will consequently be subject to separate processes.

3.2.13 LOGISTICS

The Vlakvarkfontein Coal mine has been in operation since 2010 and all access routes are used by coal haul trucks and other vehicles to access the mine. The mine is located south of the R555. Refer to Figure 13 to see the location map of Vlakvarkfontein in relation to the major roads in the area, as well as the preliminary infrastructure layout map Figure 11: Proposed infrastructure (blue current and others new)) to see the on-site roads. There is a railway line just to the north of the mine with a siding, however, Vlakvarkfontein’s coal is not currently loaded on trains at this siding. All coal is transported by 34-ton coal haulers /side tippers to various power stations. The current distribution route is from the mine to the Hawerklip siding and Majuba power station.

3.2.14 LIST OF MAIN MINING ACTIONS, ACTIVITIES AND PROCESSES OCCURRING ON SITE

The main mining actions, activities and process that are planned to take place on site are listed in Table 8. All actions, activities and processes have been grouped into each of the relevant project phases namely: pre-construction, construction, operation, decommissioning, rehabilitation and closure. For the purpose of this report, the following broad definitions apply:

- Pre-construction refers to the phase in which planning takes place;
- Construction refers to the phase in which the site is prepared and infrastructure is established;
- Operation refers to the phase in which physical mining and production takes place- this phase will include ongoing progressive rehabilitation efforts;
- Decommissioning refers to the phase in which infrastructure is removed and final rehabilitation efforts are applied and their success monitored; and
- Closure refers to the phase in which maintenance and rehabilitation monitoring are undertaken to ensure that the mines closure objectives are met.

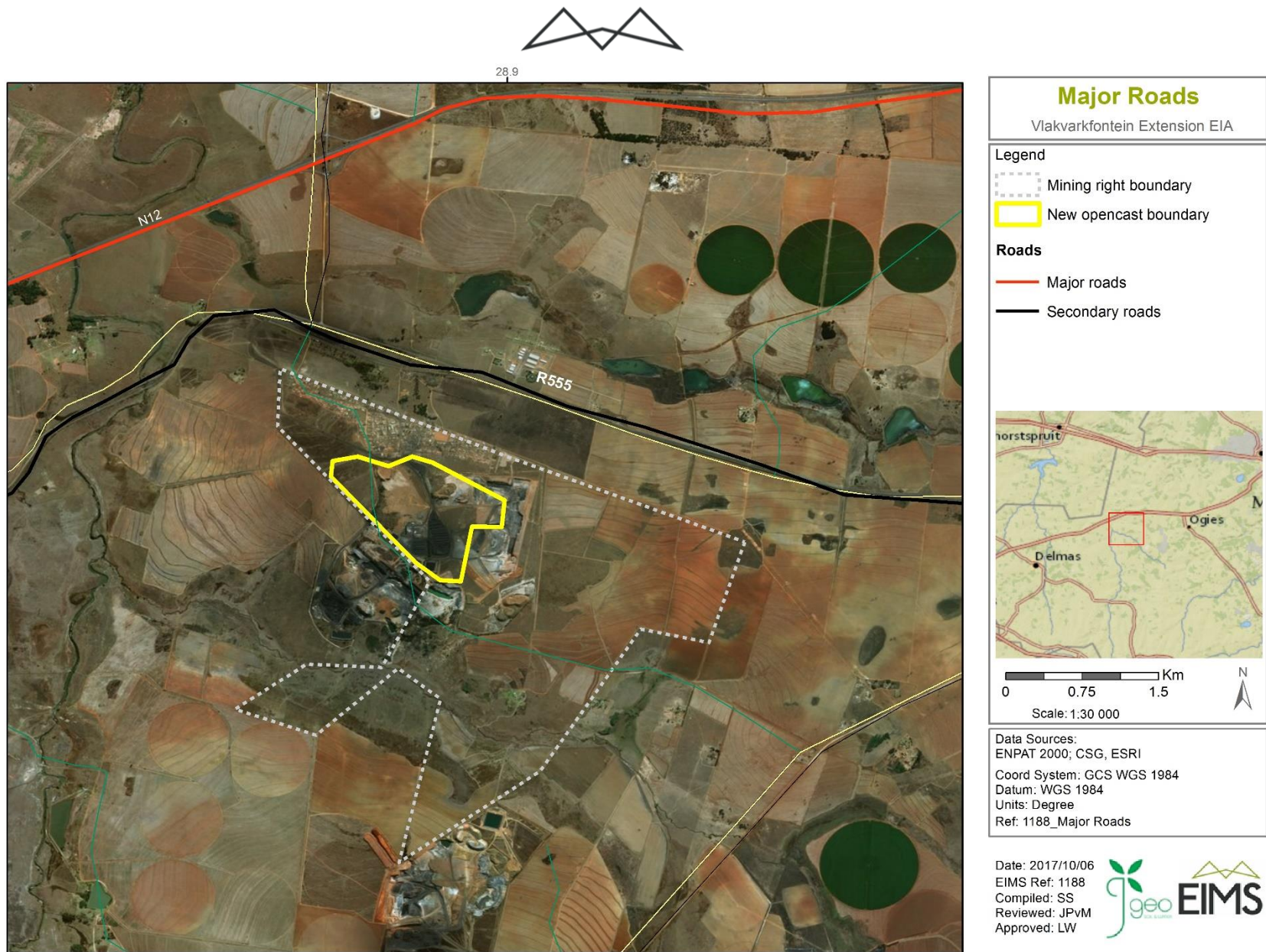


Figure 15 : Major roads in the study area with the R555 in black and the N12 in red.



Table 8: List of main action, activities or processes on site and per phase

Main Process	Activity/ Action/ Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
Site preparation	Vegetation clearance		As required	As required	As required	
	Removal of infrastructure		As required	As required	As required	
	Planned placement of infrastructure		At start of phase	As required		
	Establishment of construction contractor area		At start of phase	As required		
Human management resources	Employment/recruitment		At start of phase	As required	As required	As required
	I&AP consultations		At start of phase	On-going	On-going	On-going
	CSI initiatives		At start of phase	On-going	On-going	On-going
	Skills development programmes	At start of phase	On-going	On-going	On-going	On-going
	Environmental awareness training		At start of phase	On-going	On-going	As required
	HIV/AIDS Awareness programmes		At start of phase	On-going	On-going	



Main Process	Activity/ Action/ Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
	Integration with Municipalities' strategic long-term planning	At start of phase	On-going	On-going	On-going	
Earthworks	Stripping and stockpiling of soils		At start of phase	As required	As required	
	Cleaning, grubbing and bulldozing		At start of phase	As required	As required	
	Removal of building waste and cleared vegetation		At start of phase	As required		
	Digging trenches and foundations		At start of phase	As required	As required	
	Blasting		As required	As required	As required	
	Establishing storm water management measures		At start of phase	As required	As required	
	Establishment of firebreak		At start of phase	As required	As required	
Civil Works	Establishment of infrastructure and services		At start of phase	As required		
	Mixing of concrete and concrete works		As required	As required		
	Establishment of PCD and storm water/return water dam		At start of phase	As required	On-going	



Main Process	Activity/ Action/ Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
	Establishment of dewatering pipelines		At start of phase	As required		
	Establishment of mobile office and ablution block		At start of phase	As required	As required	
	Sewage and sanitation		At start of phase	On-going	On-going	
	Establishment of fuel storage area		At start of phase			
	Establishment of chemical storage area		At start of phase			
	Establishment of general waste area		At start of phase	On-going		
	Access control and security		At start of phase	As required	As required	
	General site management		On-going	On-going	On-going	On-going
Open-cast and Underground Mining	Drilling		As required	As required		
	Blasting		As required	As required		
	Excavations		As required	As required		
	Removal of overburden by dozing and load haul			As required		



Main Process	Activity/ Action/ Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
	Establishment of internal haul roads			As required	As required	
	Removal of ore			On-going		
	Establishment of RoM stockpiles			As required	As required	
	Establishment of Product Stockpiles			On-going	On-going	
	De-watering of old underground workings			On-going	On-going	
	Pumping of water to PCD			On-going	On-going	
	Waste rock dumps for backfilling			On-going	On-going	
	Soil management		On-going	On-going	On-going	On-going
	Water management		On-going	On-going	On-going	On-going
	Concurrent rehabilitation			On-going	On-going	On-going
	Water treatment			On-going	On-going	On-going
Infrastructure removal	Dismantling and demolition of infrastructure				As required	
	Blasting				As required	
	Safety control				On-going	On-going
	Backfilling of pits and voids			On-going	On-going	



Main Process	Activity/ Action/ Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
Rehabilitation	Slope stabilisation			On-going	On-going	On-going
	Erosion control			On-going	On-going	On-going
	Landscaping			On-going	On-going	On-going
	Replacing topsoil			On-going	On-going	On-going
	Removal of alien/invasive vegetation			On-going	On-going	On-going
	Re-vegetation			On-going	On-going	On-going
	Restoration of natural drainage patterns				On-going	On-going
	Remediation of ground and surface water			On-going	On-going	On-going
	Rehabilitation of external roads				On-going	On-going
Maintenance	Initiate maintenance and aftercare program				At end of phase	On-going
	Environmental aspect monitoring			On-going	On-going	On-going
	Monitoring of rehabilitation					On-going



4 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation identified which may relate to the proposed project. A summary of the applicable legislation is provided in Table 9 below. The primary legal requirement for this project stems from the need for an EA to be granted by the competent authority, which is the DMR, in accordance with the requirements of both the NEMA and MPRDA. In addition, there are numerous other pieces of legislation governed by many acts, regulations, standards, guidelines and treaties on an international, national, provincial and local level, which should be considered in order to assess the potential applicability of these for the proposed activity. More detail on the legislative framework is presented in Section 4.1 below.

Table 9: Applicable Legislation and guidelines overview

Applicable Legislation and Guidelines	Reference Where Applied
(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);	
APPLICABLE LEGISLATION	
<p>Constitution of the Republic of South Africa, Act 108 of 1996</p> <p>The constitution of any country is the supreme law of that country. The Bill of Rights in chapter 2 section 24 of the Constitution of South Africa Act (Act 108 of 1996) makes provisions for environmental issues and declares that: “Everyone has the right -</p> <p>(a) to an environment that is not harmful to their health or well-being; and</p> <p>(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</p> <p>(i) prevent pollution and ecological degradation;</p> <p>(ii) promote conservation; and</p> <p>(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”</p> <p>Therefore, the EIA is conducted to fulfil the requirement of the Bill of Rights.</p>	Throughout the SR and EIR process
<p>National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) and the EIA Regulations (2014) thereunder:</p> <p>The NEMA (1998) requires that a project of this nature (inclusive of a Mining Right) must undergo a Scoping and EIA; an Environmental Management Programme must also be compiled. Regulations applicable to this project include the following:</p> <ul style="list-style-type: none"> • EIA Regulations R.982 (2014) in terms of NEMA. • Listing Notice 2: R.984 (2014) in terms of NEMA. 	Throughout the SR and EIR process



Applicable Legislation and Guidelines	Reference Where Applied
<p>Minerals and Petroleum Resources Development Act (MPRDA) (Act no 28 of 2002), as amended and Mineral and Petroleum Resource Development Regulations, 2004 as amended:</p> <p>The MPRDA (2002) requires an applicant who wishes to proceed with a mining project to obtain a Mining Right, part of which requires the applicant to obtain Environmental Authorisation in terms of the NEMA (1998).</p>	<p>Throughout the SR and EIR process</p>
<p>National Water Act (NWA) (Act 36 of 1998):</p> <p>The NWA recognises that water is a scarce and unevenly distributed national resource which must managed encompassing all aspects of water resources.</p> <p>In terms of Chapter 4 of the NWA, activities and processes associated with the proposed mine extension and associated infrastructure, are required to be licensed by the Department of Water and Sanitation (DWS). An Integrated Water Use Licence Application (IWULA) will be lodged with the DWS in terms of Section 21 of the NWA, which lists several water uses requiring authorisation. Furthermore, an amended Integrated Water and Waste Management Plan (IWWMP) will be compiled and submitted in support of the IWULA.</p>	<p>Throughout the process – all water related aspects</p>
<p>National Heritage Resources Act, 1999 (Act no 25 of 1999):</p> <p>The National Heritage Resources Act aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations. Due to the extent of the project, it is likely that some heritage resources and palaeontological features are likely to occur within the project boundary area.</p>	<p>Heritage specialist study and Palaeontological, EIA, EMP.</p>
<p>Specific Environmental Management Acts (SEMAs):</p> <p>The SEMAs refer to specific portions of the environment where additional legislation over and above the NEMA (1998) is applicable. SEMAs relevant to this application include the following:</p> <ul style="list-style-type: none"> • National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004). • National Environmental Management: Air Quality Act, 2004 (Act no 39 of 2004). • National Environmental Management: Waste Act, 2008 (Section 4.1.4) (Act no 59 of 2008). 	<p>Specialist studies, Baseline description and EMP. Permits to be applied for if any protected tree species are to be removed from the site.</p>



Applicable Legislation and Guidelines	Reference Where Applied
APPLICABLE GUIDELINES	
<p>Integrated Environmental Management Information Guidelines series:</p> <p>This series of guidelines was published by the Department of Environmental Affairs (DEA), and refers to various environmental aspects. Applicable guidelines in the series include:</p> <ul style="list-style-type: none"> • Guidelines 5: Companion to NEMA EIA Regulations of 2010 • Guideline 7: Public Participation. • Guideline 9: Need and desirability. <p>Additional guidelines published in terms of the NEMA EIA Regulations, in particular:</p> <ul style="list-style-type: none"> • Guideline 3: General Guide to EIA Regulations, 2006 • Guideline 4: Public Participation in support of the EIA Regulations, 2006 • Guideline 5: Assessment of alternatives and impacts in support of the EIA Regulations, 2006 	<p>The guidelines will be used throughout the Scoping and Environmental Impact Report process.</p>
<p>Best Practise Guideline (BPG) series:</p> <p>The BPG series is a series of publications by the then Department of Water Affair and Forestry (now DWS – Department of Water and Sanitation) providing best practice principles and guidelines relevant to certain aspects of water management. Best practice guidelines relevant to this project include the following:</p> <ul style="list-style-type: none"> • BPG A4: Pollution Control Dams. • BPG H1: Integrated Mine Water Management. • BPG H2: Pollution Prevention and Minimisation of Impacts. • BPG H3: Water Reuse and Reclamation. • BPG H4: Water treatment. • BPG G1: Storm Water Management. • BPG G2: Water and Salt balances. • BPG G3: Water Monitoring Systems. • BPG G4: Impact Prediction 	<p>Surface water and groundwater specialist studies, EIA and EMP.</p>



4.1 APPLICABLE NATIONAL LEGISLATION

The legal framework within which the Vlakvarkfontein Coal Mine operates is governed by many Acts, Regulations, Standards and Guidelines on an international, national, provincial and local level. Legislation applicable to the project includes (but is not limited to):

4.1.1 THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT

The MPRDA aims to “make provision for equitable access to, and sustainable development of, the nation’s mineral and petroleum resources”. The MPRDA outlines the procedural requirements that need to be met to acquire mineral and petroleum rights in South Africa. The MPRDA governs the sustainable utilisation of South Africa’s mineral resources. In the event that the proposed activities require material (e.g. sand, gravel, aggregate) for the purposes of construction then the provisions of the MPRDA may apply. The MPRDA aims to “make provision for equitable access to and sustainable development of the nation’s mineral and petroleum resources”. The MPRDA outlines the procedural requirements that need to be met to acquire mineral and hydrocarbon rights in South Africa.

In terms of the MPRDA an Exploration Right must be issued prior to the commencement of any exploration activities. As per Section 79(4)(a) and (b) of the MPRDA, the Applicant is required to conduct an EIA and submit an EMPR for approval as well as to notify in writing and consult with Interested and Affected Parties (I&APs) within 120 days of acceptance of the Application. The MPRDA also requires adherence with related legislation, chief amongst them is the National Environmental Management Act (Act No. 107 of 1998, NEMA) and the National Water Act (Act No. 36 of 1998, NWA).

Several amendments have been made to the MPRDA. These include, but are not limited to, the amendment of Section 102, concerning amendment of rights, permits, programmes and plans, to requiring the written permission of the Minister for any amendment or alteration; and the section 5A(c) requirement that landowners or land occupiers receive twenty-one (21) days’ written notice prior to any activities taking place on their properties. One of the most recent amendments requires all mining related activities to follow the full NEMA process as per the 2014 EIA Regulations, which came into effect on 4 December 2014. Section 102 applications for amendment of both the existing EMPR and MWP for Vlakvarkfontein Coal Mine will be completed as part of the project. A S102 application has been made to DMR along with the application for an EA.

In support of the amendment to the mining right submitted by Ntshovelo, the applicant is required as to conduct a Scoping Report, EIA /EMP and I&AP consultations that need to be submitted to the DMR for adjudication. This report has been compiled in accordance with Regulation 49 of the MPRDA in order to satisfy the criteria for a Scoping Report. Pending presentation of the results of the study and inclusion of comment from I&AP’s, the Final Scoping Report will be submitted to the DMR for review. The dates of the review and commenting period for the draft EIA/EMPR will be determined at a later date and communicated to all registered I&AP’s.

4.1.2 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA regulations, the applicant is required to appoint an environmental assessment practitioner (EAP) to undertake the EIA, as well as conduct the public participation process. In South Africa, EIA became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant environmental authorisation. On 21 April 2006 the Minister of Environmental Affairs and Tourism promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were amended in June 2010 and again in December 2014. The December 2014 NEMA regulations are applicable to this project. Mining Activities officially became governable under the NEMA EIA in December 2014.

The objective of the Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the activities that have been identified. The purpose of these



procedures is to provide the competent authority with adequate information to make decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorized, and that activities which are authorized are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

In accordance with the provisions of Sections 24 (5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIA's in order to apply for, and be considered for, the issuing of an EA. These Regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity. The Regulations differentiate between a simpler Basic Assessment Process (required for activities listed in GN R. 983 and 985) and a more complete EIA process (activities listed in GN R. 984). In the case of this project there are activities triggered under GN R. 984 and as such a full EIA process is necessary. Table 5 presents all the anticipated listed activities under the NEMA EIA Regulations (2014) that are applicable to this project.

Approval is sought for the following activities:

- Construction of pollution control dams and dirty water storage reservoirs with a combined capacity of 50 000m³ or more. The dam wall height falls below 5m;
- Construction of access roads and haul roads where the road is wider than 8m;
- Extending of existing farm roads/ haul roads by more than 1km;
- Physical alteration of vacant agricultural land for mining. The total area to be transformed exceeds 20 hectares;
- Construction of a fuel storage facility; and
- Construction of clean and dirty water canals in and around the mining areas with a width of more than 36 cm.

A Scoping and EIA process is reserved for activities which have the potential to result in significant impacts which are complex to assess. Scoping and EIA accordingly provides a mechanism for the comprehensive assessment of activities that are likely to have more significant environmental impacts. Figure 9 below provides a graphic representation of all the components of a full EIA process.

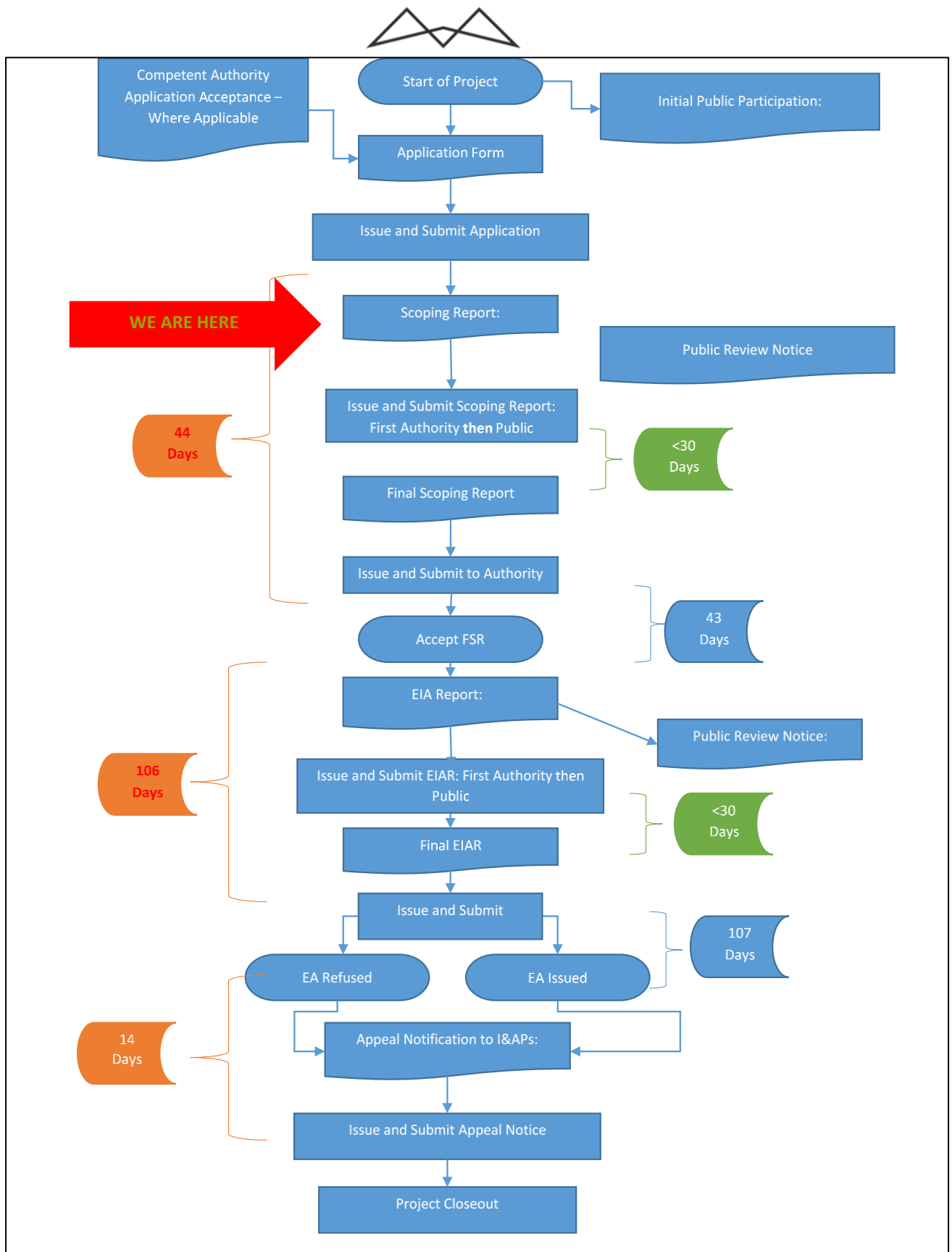


Figure 16: EIA process diagram.



Section 24 P of the NEMA requires that an applicant for an environmental authorisation relating to prospecting, mining or production must, before the Minister responsible for mineral resources issues the environmental authorisation, comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts. Therefore, the potential environmental liabilities associated with the proposed activity must be quantified and indicate the method of financial provision in line with the National Environmental Management Act (1998): Regulations pertaining to the financial provision for prospecting exploration, mining and production, (2015). The financial provision costs in line with DMR guidelines will be presented in the EIA report.

Table 10 below indicates the Listed activities in terms of the NEMA Regulations that are applicable to the proposed extension of the Vlakvarkfontein Coal Mine.

Table 10: Listed activities in terms of the NEMA Regulations

Notice #:	Activity #:	Description:	Triggered by:
Activities in terms of NEMA (1998)			
GNR 983	9	<p><i>The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—</i></p> <p><i>(i) with an internal diameter of 0,36 metres or more; or</i></p> <p><i>(ii) with a peak throughput of 120 litres per second or more;</i></p> <p><i>excluding where—</i></p> <p><i>(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or</i></p> <p><i>(b) where such development will occur within an urban area.</i></p>	Proposed Water Treatment Plant / water pipelines
GNR 983	12	<p><i>"The development of—</i></p> <p><i>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</i></p> <p><i>where such development occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</i></p> <p><i>excluding—</i></p>	PCD



Notice #:	Activity #:	Description:	Triggered by:
		<p><i>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p> <p><i>(dd) where such development occurs within an urban area;</i></p> <p><i>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</i></p> <p><i>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared. "</i></p>	
R 983	13	<i>The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.</i>	PCD -the exact size and capacity of the dam will be determined in the EIA phase.
R 983	14	<i>The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.</i>	Diesel storage on site up to 100 cubic meters
R 983	19	<p><i>"The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i></p> <p><i>but excluding where such infilling, depositing, dredging, excavation, removal or moving —</i></p> <p><i>(a) will occur behind a development setback;</i></p> <p><i>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</i></p>	Infilling/deposition during upgrade



Notice #:	Activity #:	Description:	Triggered by:
		<p><i>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</i></p> <p><i>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</i></p> <p><i>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies."</i></p>	
GNR 983	24	<p><i>"The development of a road—</i></p> <p><i>(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</i></p> <p><i>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road—</i></p> <p><i>(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;</i></p> <p><i>(b) where the entire road falls within an urban area; or</i></p> <p><i>(c) which is 1 kilometre or shorter."</i></p>	Internal haul roads for transporting of coal
GN983	25	<p><i>The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres.</i></p>	PCD
GNR 983	27	<p><i>"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></p> <p><i>(i) the undertaking of a linear activity; or</i></p>	Open Cast Extension



Notice #:	Activity #:	Description:	Triggered by:
		<i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.”</i>	
GN983	28	<p><i>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</i></p> <p><i>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or</i></p> <p><i>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</i></p> <p><i>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</i></p>	Mining (industrial) development
GN983	31	<p><i>The decommissioning of existing facilities, structures or infrastructure for—</i></p> <p><i>(i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014;</i></p> <p><i>(ii) any expansion and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 3 of 2014;</i></p> <p><i>(iii)</i></p> <p><i>(iv) any phased activity or activities for development and related operation activity or expansion or related operation activities listed in this Notice or Listing Notice 3 of 2014; or</i></p> <p><i>(v) any activity regardless the time the activity was commenced with, where such activity:</i></p> <p><i>(a) is similarly listed to an activity in (i) or (ii) above; and</i></p>	Decommissioning & relocation of existing facilities



Notice #:	Activity #:	Description:	Triggered by:
		<p><i>(b) is still in operation or development is still in progress;</i></p> <p><i>excluding where—</i></p> <p><i>(aa) activity 22 of this notice applies; or</i></p> <p><i>(bb) the decommissioning is covered by part 8 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies.</i></p>	
GN983	45	<p><i>The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure—</i></p> <p><i>(i) has an internal diameter of 0,36 metres or more; or</i></p> <p><i>(ii) has a peak throughput of 120 litres per second or more; and</i></p> <p><i>(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or</i></p> <p><i>(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;</i></p> <p><i>excluding where such expansion—</i></p> <p><i>(aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or</i></p> <p><i>(bb) will occur within an urban area.</i></p>	Utilization of existing pipelines
GNR 983	46	<p><i>The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure—</i></p> <p><i>(i) has an internal diameter of 0,36 metres or more; or</i></p>	Possible utilization of existing pipelines



Notice #:	Activity #:	Description:	Triggered by:
		<p><i>(ii) has a peak throughput of 120 litres per second or more; and</i></p> <p><i>(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or</i></p> <p><i>(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;</i></p> <p><i>excluding where such expansion—</i></p> <p><i>(aa) relates to the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve or railway line reserve; or</i></p> <p><i>(bb) will occur within an urban area.</i></p>	
GNR 983	48	<p><i>The expansion of—</i></p> <p><i>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or</i></p> <p><i>(ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;</i></p> <p><i>where such expansion occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding—</i></p> <p><i>(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p>	Possible utilization / expansion of existing infrastructure



Notice #:	Activity #:	Description:	Triggered by:
		<p><i>(bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p> <p><i>(dd) where such expansion occurs within an urban area; or</i></p> <p><i>(ee) where such expansion occurs within existing roads, road reserves or railway line reserves.</i></p>	
GNR 983	50	<i>The expansion of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, where the combined capacity will be increased by 50000 cubic metres or more</i>	Existing underground penstock area may trigger this
GNR 983	56	<p><i>"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-</i></p> <p><i>(i) where the existing reserve is wider than 13,5 meters; or</i></p> <p><i>(ii) where no reserve exists, where the existing road is wider than 8 metres;</i></p> <p><i>excluding where widening or lengthening occur inside urban areas."</i></p>	Internal haul roads for transporting of coal
GNR 983	67	<p><i>Phased activities for all activities—</i></p> <p><i>(i) listed in this Notice, which commenced on or after the effective date of this Notice or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;</i></p> <p><i>excluding the following activities listed in this Notice-</i></p> <p><i>17(i)(a-d); 17(ii)(a-d); 17(iii)(a-d); 17(iv)(a-d); 17(v)(a-d); 20; 21; 22; 24(i); 29; 30; 31; 32;</i></p>	General mining activities



Notice #:	Activity #:	Description:	Triggered by:
		<p>34; 54(i)(a-d); 54(ii)(a-d); 54(iii)(a-d); 54(iv)(a-d); 54(v)(a-d); 55; 61; 64; and 65; or</p> <p>(ii) listed as activities 5, 7, 8(ii), 11, 13, 16, 27(i) or 27(ii) in Listing Notice 2 of 2014 or similarly listed in any of the previous NEMA notices, which commenced on or after the effective date of such previous NEMA Notices;</p> <p>where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold."</p>	
GNR 984	6	<p>"The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding–</p> <p>(i) activities which are identified and included in Listing Notice 1 of 2014;</p> <p>(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;</p> <p>(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or</p> <p>(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day. "</p>	Possibly triggered if new PCD inflow exceeds 2000 cubic meters / day
GNR 984	15	<p>"The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for–</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan. "</p>	The extension of the mining area.
GNR 984	16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or	A PCD will be constructed. The exact size and capacity of the



Notice #:	Activity #:	Description:	Triggered by:
		<i>higher or where the high-water mark of the dam covers an area of 10 hectares or more."</i>	dam will be determined in the EIA phase.
GN 984	17	<p><i>"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—</i></p> <p><i>(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or</i></p> <p><i>(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;</i></p> <p><i>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.</i></p>	Mining Activities
GN985	12	<p><i>The clearance of an area of 300 square meters 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.</i></p> <p><i>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</i></p>	All infrastructure and open put extension – site falls within endangered ecosystem

4.1.3 THE NATIONAL WATER ACT

The National Water Act, 1998 (Act 36 of 1998) (NWA) makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the EIA regulations. A person may use water, if the use is-

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

These processes are described in Figure 15.

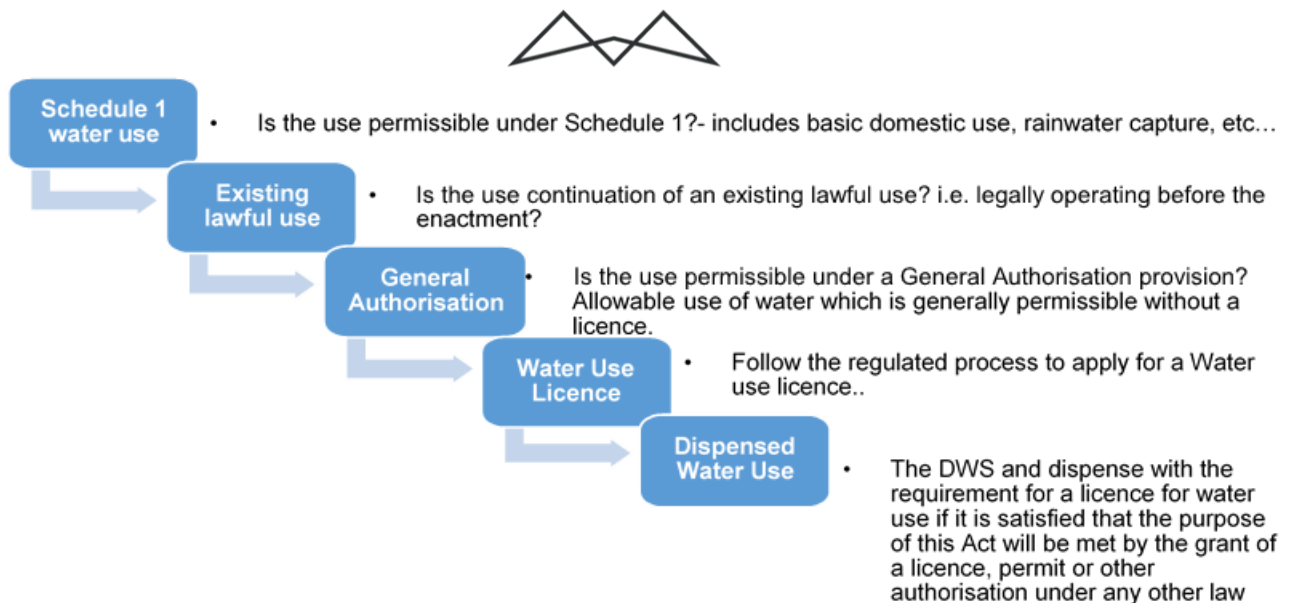


Figure 17: Authorization Process for new water uses

The NWA defines 11 water uses. A water use may only be undertaken if authorised by the Department of Water and Sanitation (DWS). Water users are required to register certain water uses that actually took place on the date of registration, irrespective of whether the use was lawful or not. The water uses for which an authorisation issued can be issued includes:

- Taking water from a water resource;
- Storing water;
- Impeding or diverting the flow of water in a watercourse;
- Engaging in a stream flow reduction activity contemplated in section 36;
- Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;
- Disposing of waste in a manner which may detrimentally impact on a water resource;
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Altering the bed, banks, course or characteristics of a watercourse;
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- Using water for recreational purposes.

Ntshovelo was granted an Integrated Water Use Licence (IWUL) in terms of Chapter 4 of the NWA, Licence No: 4/B20F/AGJ/1131 and File No: 16/2/7B100/C249, dated 14 October 2011, for the following water uses:

- Section 21(a): Taking of water from a water resource;
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource; and
- Section 21(j): Removing, discharging or disposing of water found underground.



Further to the issued IWUL, additional water uses were identified and an Integrated Water Use License Application (IWULA) was compiled and submitted to the DWS (previously the Department of Water Affairs (DWA)). The IWUL was granted on 22 September 2016 (Licence No. 03/B20A/G4845) The following water use was included additionally in the new IWULA:

- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource.

The mine is in the process of applying for an amended IWUL to incorporate the proposed changes to the MWP and new water uses.

Table 11: Water uses applicable to mine expansion

Activity #	Listed Activity Description	Reason for Inclusion
NWA Activities		
Section 21(a)	Taking water from a water resource	Potable water purposes from borehole(s) for use as drinking water, dewatering of underground area
Section 21(b)	Storing Water	Storage of water in penstock area
Section 21(f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit	Penstock area
Section 21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource; and	PCD, penstock, waste stockpiles (discard dumps, filter cake and possibly waste rock dumps)
Section 21(j)	Removing, discharging or disposing of water found underground.	Dewatering of open pit
Section 21 (c) and 21 (i)	21(c) Impeding or Diverting the Flow of Water in a Water Course; and 21(i) Altering the Bed, Banks, Course Or Characteristics Of A Water Course	Water crossings

An important regulation under NWA is the GN704 guideline document (2000). This a guideline document for the implementation of regulations on use of water for mining and related activities aimed at the protection of water resources.



4.1.4 CATCHMENT MANAGEMENT STRATEGIES

Catchment Management Agencies (CMAs) are tasked with coordinating the water demands, interests and responsibilities of all relevant government departments, institutions and water users within a specific CMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a CMA is the Catchment Management Strategy (CMS) which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources. According to DWS' water management areas delineations, Ntshovelo Mining Resources (Pty) Limited's Vlakvarkfontein Coal Mine mining right area falls within the Olifants water management area, delineated as water management area No, 4, which subsequently falls under the B Primary drainage area.

4.1.5 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT

The applicable waste act is no. 59 of 2008: National Environmental Management: Waste Act, 2008 (NEM:WA). On 2 June 2014 the National Environmental Management: Waste Amendment Act came into force. Waste is accordingly no longer governed by the MPRDA, but is subject to all the provisions of the National Environmental Management: Waste Act, 2008 (NEMWA).

Section 16 of the NEMWA must also be considered which states as follows:

A holder of waste must, within the holder's power, take all reasonable measures to-

- "Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;
- Reduce, re-use, recycle and recover waste;
- Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
- Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;
- Prevent any employee or any person under his or her supervision from contravening the Act; and
- Prevent the waste from being used for unauthorised purposes."

These general principles of responsible waste management will be incorporated into the requirements in the EMP to be implemented for this project.

Waste can be defined as either hazardous or general in accordance to Schedule 3 of the NEMWA (2014) as amended. "Schedule 3: Defined Wastes" has been broken down into two categories – Category A being hazardous waste; and Category B being general waste. Under Category A (hazardous waste), the act makes allowance for, but not limited to, "wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal; Oil wastes and wastes of liquid fuels; and Construction wastes".

In order to attempt to understand the implications of these waste groups, it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means "any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."
- Residue deposits: means "any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."
- Residue stockpile: means "any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining



operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act.”

- General waste: means “waste that does not pose an immediate hazard or threat to health or to the environment, and includes – domestic waste; building and demolition waste; business waste; inert waste; or any waste classified as non-hazardous waste in terms of the regulations made under Section 69.”

Table 12 below presents the anticipated NEMWA listed activities for the mine extension project.

Table 12: Anticipated NEMWA Listed Activities

Activity #	Listed Activity Description	Reason for Inclusion
NEMWA listed activities - Government Notice R921		
B1	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	A PCD and wastewater/temporary modular sewage treatment plant will be required.
B4	The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater or sewage.	Water treatment plant and temporary ablation facilities will be constructed.
B 5	The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage.	This is applicable to the water treatment plant and oil separators.
B 10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	The construction of PCD's and water treatment plant.
B 11	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	Dumps & stockpiles are residue deposits resulting from activities which require a mining right.
C 1	The storage of hazardous waste at a facility that has the capacity to store in excess of 80m ³ of hazardous waste at	Storage of hazardous waste in a PCD.



	any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste.	
C 2	The storage of general waste at a facility that has the capacity to store in excess of 100m ³ of general waste at any one time, excluding the storage of waste in lagoons or temporary storage of such waste.	Storage of hazardous waste in a PCD.

Furthermore, the NEM:WA provides for specific waste management measures to be implemented; as well as providing for the licensing and control of waste management activities. Waste management activities will be applicable to the proposed residue stockpiles in terms of Category B, Activity 11 of GNR 921, and, therefore, form of the application process.

4.1.6 NEMWA THE PLANNING AND MANAGEMENT OF RESIDUE STOCKPILES AND RESIDUE DEPOSITS REGULATIONS, 2015 (GN R 632):

This regulates the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation.

4.1.7 NEMWA NATIONAL NORMS AND STANDARDS FOR THE ASSESSMENT OF WASTE FOR LANDFILL DISPOSAL, 2013 (GN R. 635)

These norms and standards prescribe the requirements for the assessment of waste prior to disposal to landfill. The aim of the waste assessment tests is to characterise the material to be deposited or stored in terms of the above-mentioned waste assessment guidelines set by the DEA.

4.1.8 NEMWA WASTE CLASSIFICATION AND MANAGEMENT REGULATIONS, 2013 (GN R. 634)

Chapter 9 of the above-mentioned Regulations stipulates the requirements for a motivation for and consideration of listed Waste Management Activities that do not require a Waste Management License. The motivation must:

- Demonstrate that the waste management activity can be implemented without unacceptable impacts on, or risk to, the environment or health;
- Must provide a description of the waste;
- Description of waste minimisation or waste management plans;
- Description of potential impacts, etc.:
- The transitional provisions under Chapter 6 of this Regulation prescribes timeframes in which all waste must be classified within 18 months from the date of commencement of these regulations (23 August 2013).

Waste streams generated from mine activities will, where applicable, be classified accordingly to determine their nature (i.e. general or hazardous), and subsequently managed and disposed of in accordance with the relevant legislative requirements.



4.1.9 NEMWA NATIONAL NORMS AND STANDARDS FOR DISPOSAL OF WASTE TO LANDFILL, 2013 (GN R. 636)

Once the waste has been assessed and classification is done (waste type identified) the guidelines in this Regulation can be used to determine the minimum requirements for the landfill and containment barrier design. This will distinguish between Class A, Class B, Class C, or Class D landfills and the associated requirements.

4.1.10 THE NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT

The National Environmental Management: Air Quality Act (NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

- To protect the environment by providing reasonable measures for-
 - the protection and enhancement of the quality of air in the republic;
 - the prevention of air pollution and ecological degradation; and
 - securing ecologically sustainable development while promoting justifiable economic and social development; and
- Generally to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and wellbeing of people.

The NEMAQA (Act No. 39 of 2004 as amended) mandates the Minister of Environment to publish a list of activities which result in atmospheric emissions and consequently cause significant detrimental effects on the environment, human health and social welfare. All scheduled processes as previously stipulated under the Air Pollution Prevention Act (APPA) are included as listed activities with additional activities being added to the list. The updated Listed Activities and Minimum National Emission Standards were published on the 22nd November 2013 (Government Gazette No. 37054).

According to the Air Quality Act, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

The National Pollution Prevention Plans Regulations were published in March 2014 (Government Gazette 37421) and tie in with The National Greenhouse Gas Emission Reporting Regulations which took effect on 3 April 2017. In summary the regulations aim to prescribe the requirements that pollution prevention plans of greenhouse gases declared as priority air pollutants need to comply with, in terms of the NEMAQA. The regulations specify who needs to comply, and by when, as well as prescribing the content requirements. Mines do have an obligation to report on the GHG emissions under these regulations.

4.1.11 THE NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resources Act (NHRA) (Act 25 of 1999) stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...” The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA, MPRDA and the DFA legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the



inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008b):

The NEMA 23(2)(b) states that an integrated environmental management plan should, "...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage".

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 (Fourie, 2008b).

The MPRDA defines 'environment' as it is in the NEMA and, therefore, acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the National Heritage Resources Act that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008b).

In accordance with the legislative requirements and EIA rating criteria, the regulations of the South African Heritage Resources Agency (SAHRA) and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive and legally compatible Heritage Scoping Report (HSR) is compiled.

4.1.12 THE NATIONAL FORESTS ACT

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that *"no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister."*

The exact number of protected species on the proposed site is not known at this stage however a biodiversity study will be conducted for the EIA phase of the project.

4.1.13 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

- Category 1a Listed Invasive Species: Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated;
- Category 1b Listed Invasive Species: Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled;
- Category 2 Listed Invasive Species: Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be; and
- Category 3 Listed Invasive Species: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.



The provisions of this Act have been considered and where relevant incorporated into the proposed mitigation measures and requirements of the EMP.

4.1.14 THE SUB-DIVISION OF AGRICULTURAL LAND ACT

In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970), any application for change of land use must be approved by the Minister of Agriculture, while under the Conservation of Agricultural Resources Act (Act 43 of 1983) no degradation of natural land is permitted.

4.1.15 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT

The law on Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal. The Conservation of Agriculture Resources Act (Act 43 of 1983) requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

4.1.16 THE SUB-DIVISION OF AGRICULTURAL LAND ACT

The Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA) promotes optimal exploitation of minerals and mineral resources. The act provides a framework for a planning system for the country. The Act introduces provisions to cater for development principles; norms and standards; inter-governmental support; Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; Land Use Schemes (LUS); and municipal planning tribunals.

4.1.17 NOISE CONTROL REGULATIONS, 1992 (GN R.154)

In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. The Free State Province did promulgate provincial regulations (PN 24) in 1998.

The noise control regulations will need to be considered in relation to the potential noise that may be generated mainly during the construction and decommissioning phases of the proposed project. The two key aspects of the noise control regulations relate to disturbing noise and noise nuisance.

Section 4 of the regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the regulations as 'a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.

Section 5 of the noise control regulations in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as 'any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person'. Noise nuisance is anticipated from the proposed project particularly to those residents that are situated in close proximity to the project sites.

South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with these regulations. A noise specialist study is proposed for the EIA process.

4.1.18 NOISE STANDARDS

There are a few South African scientific standards (SABS) relevant to noise from mines, industry and roads. They are:

- South African National Standard (SANS) 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication';
- SANS 10210:2004. 'Calculating and predicting road traffic noise';



- SANS 10328:2008. 'Methods for environmental noise impact assessments'.
- SANS 10357:2004. 'The calculation of sound propagation by the Concave method';
- SANS 10181:2003. 'The Measurement of Noise Emitted by Road Vehicles when Stationary'; and
- SANS 10205:2003. 'The Measurement of Noise Emitted by Motor Vehicles in Motion'.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful per se. The noise assessment will take these noise standards and impacts into consideration.

4.1.19 ENVIRONMENT CONSERVATION ACT

The Environment Conservation Act (Act 73 of 1989) (ECA) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however Section 25 of the Act and the Noise Regulations (GNR 154 of 1992) promulgated under this section are still in effect. These regulations serve to control noise and general prohibitions relating to noise impact and nuisance.

4.2 PERIOD FOR WHICH AUTHORIZATION IS REQUIRED

The remaining LOM with the new extension is until 2025. Therefore, the authorisation will be required until 2025.



5 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

This section will examine the need and desirability of the proposed Vlakvarkfontein Coal Mine Extension project. This section will examine the importance of coal as a resource as well as the desirability of continuing and expanding coal mining operations at the existing Vlakvarkfontein coal mine.

5.1 THE IMPORTANCE OF COAL AS A RESOURCE

Coal, because of its strategic importance is one of the five minerals selected by the DMR for local beneficiation as it is considered critical to the on-going development of South Africa (Beneficiation Strategy for the Minerals Industry, June 2011). The driving force behind the emphasis of the importance of coal, coal mining and local beneficiation is primarily due to concerns voiced by Eskom over the future security of supply in both the medium and long term of the mineral to its coal fired electricity generating power stations.

South Africa's energy is predominately coal fuelled. Eskom's existing coal fired power stations are critical in terms of electricity production and in meeting the growing energy requirements of South Africa as a whole. Coal and coal supply is consequently seen as critical and its importance is detailed in the Eskom Transmission Ten Year Development Plan 2011 to 2020 (Eskom, 2011). Without steady, secure supply of the mineral, it is unlikely that Eskom will be able to meet the energy demands of the country. As a result, coal mining, beneficiation and supply is of paramount importance to South Africa for continued electricity generation to meet the rising energy demands of the country in the short, medium and long term.

Coal produced is used locally within municipal region but also exported. Eskom is the largest local buyer while China is the major export buyer. Demand for coal is generally very high for both market segments. Selling prices are generally regarded as stable both currently and in the foreseeable future. All coal from Vlakvarkfontein is currently delivered to Majuba power station for use by Eskom.

5.2 VLAKVARKFONTEIN OPEN CAST PIT EXTENSION

The extension of the proposed opencast mining operations at Vlakvarkfontein coal mine, will allow the continued contribution of the mine to favourable economic impacts on both the local and regional economies. The current mine reserves will be depleted by 2019, which will result in a loss of jobs and economy in the region. Therefore, the Vlakvarkfontein coal mine extension will extend the profitability and life of the Vlakvarkfontein coal operation by an additional few years, and secure the jobs of the current employees. A significant portion of the coal reserve will be sterilised if the area is not mined. If the project were not to proceed, the additional economic activity, skills development and available jobs would not be created, and the coal reserves would remain unutilised.

The proposed activities do fit in with the developments and land use of the surrounding area, which is mining. If Ntshovelo were not to proceed with the proposed operation, mining of these coal reserves will not necessarily be avoided, as another application in terms of the MPRDA, Act 28 of 2002 can be made by another company. Unless the government declares the area "off limits" to mining, or the demand for coal subsides, mining houses will continue to attempt to mine the coal reserves. In summary, the proposed Vlakvarkfontein mine extension will allow the applicant to continue producing a secure, steady supply of coal for another 6 years for use by Eskom.

The needs and desirability analysis component of the "Guideline on need and desirability in terms of the Environmental Impact EIA Regulations (Notice 819 of 2014)" includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.). Table 13 below present the needs and desirability analysis undertaken for the Vlakvarkfontein project extension.



Table 13: Needs and desirability analysis for the Vlakvarkfontein project extension

Ref #	Question	Answer
1	Securing ecological sustainable development and use of natural resources	
1.1	How were the ecological integrity considerations considered in terms of: Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Systems, Conservation Targets, Ecological drivers of the ecosystem, Environmental Management Framework, Spatial Development Framework (SDF) and global and international responsibilities.	<p>The following specialist studies are being conducted:</p> <ul style="list-style-type: none"> • Biodiversity and wetland study; • Hydrological; • Hydrogeological study; • Noise study; • Heritage and paleontological study.; • Blasting Study; and • Social Study. <p>The conclusions of these studies, and the identified impacts and mitigation measures stemming there from will be included in the EIA and EMPr. The need of the project in terms of the Nkangala District Municipal SDF will also be further considered in the EIA and EMPr.</p>
1.2	How will this project disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	<p>Refer to baseline ecological information in Section 8, and the impact assessment and mitigation measures in Section 9X of this Scoping Report. These sections will be further expanded in the EIA and EMPr, with the addition of specialist studies.</p>
1.3	How will this development pollute and / or degrade the biophysical environment? What measures were explored to either avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	
1.4	What waste will be generated by this development? What measures were explored to avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and / or	<p>Refer to waste generation and disposal in Section 3 of this Scoping Report. This aspect will be further explored in the EIA and EMPr</p>



Ref #	Question	Answer
	recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	
1.5	How will this project disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	A Heritage and paleontological specialist has been appointed to conduct a Phase 1 Heritage impact assessment and a paleontological study, the results of this study will be made available in the EIA and EMPr.
1.6	How will this project use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to the impact assessment and mitigation methods in Section 9 of this Scoping Report. It is noted that due to the nature of this project (mining of coal), a non-renewable resource will be depleted. Coal mining does, however contribute significantly to the country's economy and power generation needs, and therefore, at the current stage mining of coal is still needed within South Africa.
1.7	How will this project use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impacts on the ecosystem jeopardize the integrity of the resource and / or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	Refer to the impact assessment and mitigation methods in Section 9 of this Scoping Report.
1.7.1	Does the proposed project exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)?	The proposed project will rely on / depend on the extraction of a natural, non-renewable resource (coal) for selling to Eskom.
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and	The proposed project will extend the life of the mine in an area where coal reserves have already been identified, and are already being mined.



Ref #	Question	Answer
	intergenerational equity, and are there more important priorities for which the resources should be used?	Refer to Section 6 on alternatives in this Scoping Report.
1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The Vlakvarkfontein Mine is already an existing mine and the proposed project will be an extension of the existing mine partially utilising existing infrastructure. Additional / new infrastructure will be required in order to mine the additional coal.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts:	
1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	<p>In terms of the ecological impacts, the current knowledge gaps include:</p> <ul style="list-style-type: none"> • Detailed and site-specific background information regarding some of the environmental aspects is not yet available for the proposed extension area. However, the outstanding information will be generated through the identified specialist studies identified in Section 9 and 10 • While the expected potentially significant impacts have been preliminarily identified as part of this Scoping Process, the impacts on all environmental aspects will be explored in more detail and quantified wherever possible during the EIA Phase. • The mitigation measures associated with the impacts need to still be determined.
1.8.2	What is the level of risk associated with the limits of current knowledge?	The level of risk is low as previous specialist studies have been conducted in the areas surrounding the proposed project location, and therefore some information is already available.
1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	Sufficient information was gathered prior to the onset of this process to indicate that the potential mining of additional coal is feasible. In addition, it is noted that this project extends a current mining operation.
1.9	How will the ecological impacts resulting from this development impact on people's environmental right in terms following?	
1.9.1	Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise,	



Ref #	Question	Answer
	odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Refer to Section 8 and the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	Refer to the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Refer to Section 6, details of the alternatives considered, and Section 5 the advantages and disadvantages of the proposed activity, of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
1.13	Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr
2	Promoting justifiable economic and social development	
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following:	



Ref #	Question	Answer
2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area,	<p>The Vicor Khanye Local Municipality Integrated Development Plan (IDP) for the period of 2017 - 2018, with an unemployment rate of 21.6%.</p> <p>The Municipality is highly dependent on the neighboring Ekurhuleni Metro for job opportunities. The land uses adjacent to the N12 Corridor should be developed as economic concentrations, capitalizing off the passers-by and the linkage it provides to regional markets. The local economy is relatively diversified with the largest sector, in terms of output as well as proportional contribution being the trade sector. The growing sector is trade sector followed by the agriculture sector and the mining sector. During recent years the total output of the agriculture sector experienced significant levels of growth while the mining and minerals sector declined.</p> <p>The proposed mining of the extension into the will extend the Life of Mine (LoM) of Vlakvarkfontein, thus allowing Vlakvarkfontein to continue supplying jobs at that mine for a longer time period. The surrounding communities will also continue to benefit through direct and indirect income; as well as the mine's use of local contractors and suppliers.</p>
2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	The mine will make use of labourers from the local community as far as possible. A copy of the Social Labour Plan (SLP) will be included in the EIA / EMPr.
2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	Refer to the baseline environment in Section 8 of this Scoping Report.
2.1.4	Municipal Economic Development Strategy ("LED Strategy").	The proposed project will promote and support the sustainability of existing business; and assist in increasing local beneficiation and shared economic growth, through extending the life of the Vlakvarkfontein Mine.
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	Refer to the impact assessment and mitigation measures in Section 9 in this Scoping Report. This aspect will be further explored in the EIA and EMPr.



Ref #	Question	Answer
2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The proposed project will increase the LoM of Vlakvarkfontein, which will ensure that the community projects initiated by the mine will have an increased life. This will complement the local socio-economic initiatives identified for the area.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to the proposed public participation process in Section 7 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long term? Will the impact be socially and economically sustainable in the short- and long-term?	Refer to the impact assessment and mitigation measures in Section 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.5	In terms of location, describe how the placement of the proposed development will:	
2.5.1	Result in the creation of residential and employment opportunities in close proximity to or integrated with each other.	Refer to Section 6, details of alternatives considered in this Scoping Report.
2.5.2	Reduce the need for transport of people and goods.	
2.5.3	Result in access to public transport or enable non-motorized and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	
2.5.4	Compliment other uses in the area,	Refer to item 1.3 of this table (above). The proposed project entails the mining of additional areas to be accessed from an approved mining area. The existing land use and mining of coal will therefore be complimented by the continuation of the project.
2.5.5	Be in line with the planning for the area.	Refer to item 2.2.1 of this table (above).
2.5.6	For urban related development, make use of underutilised land available with the urban edge.	Not applicable.
2.5.7	Optimise the use of existing resources and infrastructure,	Refer to Chapter 3 of this scoping report



Ref #	Question	Answer
2.5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	
2.5.9	Discourage "urban sprawl" and contribute to compaction / densification.	The proposed project will result in the continued employment of workers as well as 15 new job opportunities. I influx of additional workers to the area as a direct result of the proposed project is not anticipated.
2.5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	Refer to items 2.5.7 – 2.5.9 of this table (above).
2.5.11	Encourage environmentally sustainable land development practices and processes	The proposed end land use will be developed in order to be environmentally sustainable in the long term.
2.5.12	Take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	Refer to item 1.7.3 of this table (above). The proposed project is associated with a portion of a strategic mineral resource (coal reserve).
2.5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential).	The proposed project will allow the mine to continue contributing to the local, regional and national Gross Domestic Product (GDPs), and also on the local communities through continued employment of employees and local contractors, as well as other influences that the mine has in the community, such as contributions to schools and clinics and other community upliftment programmes that are undertaken by the mine through their SLP.
2.5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	Refer to impact assessment and mitigation measures in Section X and Section X of this Scoping Report.
2.5.15	In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed project will ensure continued employment in the region, as well as projects implemented from the mine's SLP.



Ref #	Question	Answer
2.6	How was a risk-averse and cautious approach applied in terms of socio-economic impacts?	
2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	<p>In terms of the socio-economic impacts, the current knowledge gaps include:</p> <ul style="list-style-type: none"> • While the expected potentially significant impacts have been preliminarily identified as part of this Scoping Process, the impacts on all environmental aspects will be explored in more detail and quantified wherever possible during the EIA Phase. • The mitigation measures associated with the impacts need to still be determined.
2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The level of risk is low as the project is not expected to have far reaching impacts on socio-economic conditions.
2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	As this project extends a current mining operation, and does not constitute a new mine, a cautious approach has been implemented.
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the	Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. This aspect will be further explored in the EIA and EMPr.



Ref #	Question	Answer
	development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. Vlakvarkfontein. will in line with the regulatory requirements, provide financial provision to ensure that the mitigation measures proposed can be carried out. This aspect will be further explored in the EIA and EMPr.
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	By conducting a Scoping and EIA Process, the applicant ensures that equitable access has been considered. Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. This aspect will be further explored in the EIA and EMPr.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Refer to the impact assessment and mitigation measures in Section X of this Scoping Report. The EIA and EMPr will specify timeframes within which mitigation measures must be implemented.
2.13	What measures were taken to:	
2.13.1	Ensure the participation of all interested and affected parties.	Refer to Section X of this Scoping Report, describing the public participation process to be implemented for the proposed project.



Ref #	Question	Answer
2.13.2	Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	Refer to Section X of this Scoping Report, describing the public participation process to be implemented for the proposed project.
2.13.3	Ensure participation by vulnerable and disadvantaged persons,	The advertisement and site notice have been made available in English, Afrikaans and Zulu to assist in understanding of the project.
2.13.4	Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	A door-to-door consultation process was undertaken within the Arbor informal community in order to ensure they were made aware of the project.
2.13.5	Ensure openness and transparency, and access to information in terms of the process,	Public meetings are also planned to be held in the scoping and EIA phases of the project.
2.13.6	Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	Translators will be available at the public meetings to be held to ensure that all participants can participate in a language they are able to understand (English / Afrikaans / Zulu).
2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognized and their full participation therein will be promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to Section X of this Scoping Report, describing the public participation process to be implemented for the proposed project. This aspect will be further explored in the EIA and EMPr. The SLP will be included in the EIA / EMPr.
2.15	What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work,	Workers are educated on a regular basis as to the environmental risks that may occur within their work environment, adequate measures have been taken to ensure that the appropriate personal protective equipment is issued to workers based on the areas that they work and the requirements of their job.



Ref #	Question	Answer
	and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	
2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1	The number of temporary versus permanent jobs that will be created.	It is not anticipated that any new jobs will be created; rather, existing jobs will be maintained for a longer period of time.
2.16.2	Whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area).	
2.16.3	The distance from where labourers will have to travel.	
2.16.4	The location of jobs opportunities versus the location of impacts.	Fifteen new jobs will be created; and existing jobs will be maintained for a longer period of time.
2.16.5	The opportunity costs in terms of job creation.	
2.17	What measures were taken to ensure:	
2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	The Scoping and EIA Process requires governmental departments to communicate regarding any application. In addition, all relevant departments will be notified of the project by the EAP.
2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures.	
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Refer to Section X of this Scoping Report, describing the public participation process to be implemented for the proposed project, as well Section X, the impact on any national estate, in the Scoping Report. The SLP will be included in the EIA and EMP.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to the impact assessment and mitigation measures in Section X of the Scoping Report. This aspect will be further explored in the EIA and EMP.



Ref #	Question	Answer
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	Vlakovarkfontein will provide a Bank guarantee to DMR. The amount will be calculated using the published DMR guideline document as required by section 54 (1) of the regulations <i>"Guideline Document for the evaluation of Quantum of Closure Related Financial Provision Provided by a Mine"</i>
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Refer to Section X, description of the process followed to reach the proposed preferred site, of the Scoping Report. This aspect will be further explored in the EIA and EMP.
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to Section X of this Scoping Report. This aspect will be further explored in the EIA and EMP.



6 PROJECT ALTERNATIVES

The identification of alternatives is a key aspect of the success of the scoping process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to consider and assess in the EIA phase. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of this scope. Such constraints include social, financial and environmental issues, which will be discussed in the evaluation of the alternatives. Alternatives can typically be identified according to:

- Location alternatives;
- Process alternatives;
- Technological alternatives; and
- Activity alternatives (including the No-go option).

For any alternative to be considered feasible such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. As mentioned in Section 5 the need for the proposed project includes the following key drivers:

- The need to increase the current capacity of the coal line; and
- The need to reduce the risk associated with a single-track bottleneck on the coal line.

The alternatives are described and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical as well as environmental perspective.

Alternatives can also be distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and or scoping phases of the EIA process. Incremental alternatives typically arise during the EIA process and are usually suggested as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives. This section provides information on the development footprint alternatives, the properties considered, as well as the type of activity, activity layout, technological and operational aspects of the activity.

6.1 DETAILS OF LOCATION ALTERNATIVES

The section below describes the site / location alternatives considered as part of the project. As indicated above, Vlakvarkfontein coal mine is an existing operational mine, and has been subject to previous environmental processes, which considered alternatives in the form of both development and land use alternatives prior to approval.

6.1.1 DETAILS OF DEVELOPMENT PROPERTY

The land use of the extension area is now considered to be predominantly one of mining and related activities, therefore, there is no practical development alternative for the current Vlakvarkfontein mining area. The proposed extension of the current mining area has taken into consideration economic viability and practicality as well as the location of the coal resource.

6.1.2 CONSIDERATION OF PROPERTY

The proposed amendment of the existing MWP includes areas that are already included in the existing Mining Right of Vlakvarkfontein coal mine. Therefore, not other alternatives were considered with regards to the consideration of property.

6.1.3 DESIGN OR LAYOUT OF THE ACTIVITY

Numerous alternatives were evaluated with regard to the extent of the area to be mined, mostly linked to the presence of surface infrastructure within and adjacent to the target coal resource. The relocation of the existing



infrastructure will enable the underlying coal to be accessed, thereby increasing the total coal resources that would be available for extraction over the LOM.

Various layout options are being investigated with regards to the placement of the infrastructure at the site. The updated MWP includes preliminary positions for various aspects of the mine infrastructure including the discard dump, processing plant, roads, power line, water treatment plant and site offices. This preliminary layout will be investigated further in the EIA phase, and where necessary alternative locations and options assessed. If any infrastructure is planned to be in areas identified as being of high environmental sensitivity or if any other significant environmental concerns are noted with regards to the proposed layout then the layout may be required to be amended based on these findings. More details regarding the preliminary layout and on-site sensitivities will be provided in the EIA phase once the EIA phase specialist studies have been completed. The micro-siting information will be provided to the specialists and will inform the specialist impact assessments at the EIA phase.

The location alternatives to be investigated in the EIA phase are described below

- **Location Alternative S1a - *Maximum mining over entire area*:** This alternative involves mining over the entire proposed open cast area. This option can only be considered if no high-sensitivity no go areas are identified on the proposed site. In this development alternative, the mining and economically efficient production of coal is emphasised. Less restrictive mitigation measures will be used to protect the environmental features, thus allowing for maximum coal production. This approach has the potential to increase the financial viability of the proposed Vlakvarkfontein Coal Mine at the expense of any identified environmental features on site.
- **Location Alternative S1b - *Sensitivity-based approach*:** This alternative avoids no go areas and considers specialist recommendations regarding buffer distances from important features. In this development alternative environmental resource protection is emphasised and relies on the use and implementation of stringent mitigation measures to minimise identified adverse impacts. This development alternative will use environmental specialist planning and evaluation of mining methodologies (opencast vs. underground), mining footprint alteration, and infrastructure placement and logistic options in order to avoid consolidated sensitive environmental features and locate the operation in the least (relative) to site, sensitive location.

It is important to note that through the EIA Phase a balance between options S1a and S1b may be identified to try and optimise the mineral extraction but at the same time ensure adequate environmental and social protection. This will be discussion and comparatively assessed in the EIA by all relevant specialists.

6.2 DETAILS OF PROCESS ALTERNATIVES

The section below describes the various process alternatives considered in this scoping report.

6.2.1 MINING METHOD

Two alternative options for the main mining process have been identified, namely:

- **Process Alternative P1a - *open cast*:** This would involve an extension of the current open pit in order to mine the pillars of the in-situ coal on both 4 and 2 seams. This is the current mining process presented in the MWP.
- **Process Alternative P1b – *underground pillar extraction*:** The only other alternative method to mine the pillars would be the use of an underground pillar extraction technique. There are a number of basic pillar extraction methods. This method of mining is also referred to as retreat mining, pillar recovery, stooping, pillar robbing; and bord and pillar second workings. Since the mid-1990s, research into coal pillar mechanics in combination with new technology, education and a risk management approach to design and operation, have resulted in substantial improvements in the safety of pillar extraction.



6.2.2 DISPOSAL OF WASTES

Two main options, with additional sub-options, have been identified and are being investigated for disposal of the filter cake, the fine coal refuse material from the processing plant. These include:

- **Process Alternative P2a - *Stockpile for use as non-select product*:** This option involves temporarily stockpiling the filter cake on site and selling it off at a later stage.
- **Process Alternative P2b - *Disposal*:** This option involves disposal of discard to a surface disposal site or into the historic pit.

Several options are being investigated for the disposal of carboniferous wastes (wash plant waste rock and possibly filter cake)

- **Process Alternative P3a - *Disposal to surface waste disposal facility - located on old rehabilitated mine area*:** This option would involve the discarding of coal waste to an open ground/ surface co-disposal facility located in the old mine area which has been rehabilitated. This option would involve the creation of a new co-disposal coal discard dump at the site of approximately 400m x 400m in size.
- **Process Alternative P3b - *Disposal to surface waste disposal facility - located on un-mined area*:** This option would involve the discarding of coal waste to an open ground/ surface co-disposal facility located on an unmined area.
- **Process Alternative P3c - *Disposal of wash plant waste rock (discard) to pit and filter cake to surface disposal site*:** This option would involve the discarding of coal waste to pit and the filter cake to an open ground co-disposal facility.
- **Process Alternative P3d - *Disposal of discard and filter cake to pit*:** This option would involve the discarding of all coal waste to the open pit.

6.2.3 DE-WATERING

Two potential options for addressing the dewatering of the old flooded underground workings, were identified, namely:

- **Process Alternative P4a - *Pump-treat-discharge*:** This process would pump the water out of the old underground workings, followed by immediate treatment and discharge.
- **Process Alternative P4b - *Pump-store (in existing penstock area)-treat-discharge*:** This process alternative involves the dewatering of the underground penstock area where the coal reserves are located. This would involve dewatering into the open void (a temporary holding dam) followed by pump and treatment of the water and release of the treated water to stream.

Evaporation on site through the construction of evaporation ponds is not considered a potential or feasible alternative due to space constraints on the site. Evaporation ponds remove the water from hazardous waste, which greatly reduces its weight and volume and allows the waste to be more easily transported, treated and stored. Evaporation ponds require a very large surface area to be effective and this is not considered a practical option for the Vlakvarkfontein mine due to the limited space available on the site. This option was therefore not considered.

6.2.4 WATER SUPPLY

Two alternatives for the supply of water to the wash plant were identified, namely:

- **Process Alternative P5a - *Water obtained from dirty water containment facilities*:** Water would be obtained from dirty water containment facilities (e.g. the old penstock storage area and/or the PCD's).



- **Process Alternative P5b** - *Water from natural ground or surface water resources*: For this alternative water for the wash plant would be abstracted from boreholes.

6.3 DETAILS OF TECHNOLOGY ALTERNATIVES

This section describes the technological alternatives considered as part of the project.

6.3.1 PROCESSING TECHNOLOGY TO BE USED IN THE ACTIVITY

There are two main types of washing processing technology which could be used for coal beneficiation, namely:

- **Technology Alternative T1a** - *Dry processing*: A dry coal separator uses less water than a conventional wet processing alternative. The main and most obvious advantage of dry processing of coal is that no water is required. Dry processing is, however, not applicable on all mines and with all coal types and quantities.
- **Technology Alternative T1b** - *Wet washing*: This is the conventional processing alternative employed at most processing facilities.

6.3.2 TRANSPORT OPTIONS

There are several coal product transport options. The feasibility of these options would hinge on the final market for the coal, as well as the proximity of available transport infrastructure. The following alternatives have been considered:

- **Technology Alternative T2a** – *Road*: This would involve the transport of the product by existing road networks to the respective buyer. This is the alternative currently used to transport the coal.
- **Technology Alternative T2a** – *Rail*: This option would involve transport of the coal by rail utilizing the nearby railway siding immediately north of the mining right area.
- **Technology Alternative T2a** - *Use of conveyor*: This option would involve transport of the coal by conveyor to the buyer. There is no existing coal conveyor network within close proximity to the mine.

6.4 DETAILS OF ACTIVITY ALTERNATIVES

This section describes the activity alternatives considered as part of the project.

6.4.1 TYPE OF ACTIVITY

The appropriateness of undertaking opencast mining methods for the proposed area has been considered and will allow for mining in smaller areas whereas underground mining techniques would not be appropriate. Furthermore, due to the topography opencast mining is considered to be the most appropriate mining method. Three activity alternatives are considered in this scoping report (activity alternatives A1, A2 and A3).

- **Activity Alternative A1** – *Mining*: The land would be continued to be used for mining.
- **Activity Alternative A2** – *Farming*: This option would be to revert the land use back to its original use i.e. the land would be used for farming (cultivation/ livestock).
- **Activity Alternative A3** – *No-go option*. The ‘no-go’ or ‘do nothing’ alternative (**Alternative A3**) is the option of not undertaking the proposed activity or any of its alternatives. The ‘do nothing’ alternative also provides the baseline against which the impacts of other alternatives should be compared.

The implication of not amending the existing MWP (within the approved mining right boundary) to include the mining of additional coal resources, as indicated in the MWP, includes a reduction in the existing mining operations overall LOM, as well as compromising the ability of Vlakvarkfontein to ensure consistent coal supply to Eskom for electricity generation and extended local and regional economic benefits. The area is currently viewed as a mining area and if the no-go option is opted for, then most likely the mine will cease to operate and



the existing mining areas will be rehabilitated. An opportunity will remain for a future mine applicant to apply for rights to access the coal reserves remaining and thereby possibly re-activate mining at a later stage.

The no-go alternative means that the benefits of local and regional employment at the mine would not be realized in the long term. The proposed extension project would increase the LOM by another six years. The potential employment and economic benefits will therefore be foregone. The no-go alternative would therefore maintain the current environmental status quo at the site but would reduce the potential LOM by approximately six years.

6.5 ALTERNATIVE ASSESSMENT

This section describes the pros and cons of various alternatives described above. Input from specialists was obtained to complete this section. The findings are presented here in Table 14. The table also notes which alternatives are to be taken forward for consideration in the EIA report.



Table 14: Summary of alternative options for assessment in EIA

Alternative Category		Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
Process Alternatives	Process alternatives - Mining methods.	P1a	Open Cast	<ul style="list-style-type: none"> • Shallow and low stripping ratio. • Continue with current mining practice. • Surface impacts limited to the extent of the mining area, soil and hydrology impacts to wetlands and local rivers. • This will result in a total loss of catchment yield only during the mining-dirty water separation. • Less technically intensive. • Generally safer than underground mining. • Less expensive. • Ability to remove complete mineral resource. 	<ul style="list-style-type: none"> • Complete surface disturbance. • Irreplaceable loss of surface resources. • Significant surface health and nuisance impacts. • Dust creation. 	<p>Surface disturbance: <i>Significance: High</i></p> <p>Duration: Permanent</p> <p>Probability: High</p> <p>Reversibility: Moderate</p> <p>Irreplaceable loss: Yes</p> <p>Dust Creation: Significance: High</p> <p>Duration: Long-term</p> <p>Probability: High</p> <p>Reversibility: Low</p> <p>Irreplaceable loss: No</p>	Vlakovarkfontein is an Open Cast mine and that is the best suited mining method for this shallow coal resource according to the mine engineer	✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
					Health and Nuisance Impacts: Significance: High Duration: Long-term Probability: High Reversibility: Low Irreplaceable loss: Yes		
	P1b	Underground mining methods / in-situ pillar extraction.	<ul style="list-style-type: none"> Limited modification to catchment surface area resulting in cleaner runoff than opencast alternative. Less surface disturbance than opencast mining methods and thus less health, nuisance and dust issues. No blasting required, therefore minimal blasting 	<ul style="list-style-type: none"> Old mine – need to dewater & re-support. Will not get all coal out Subsidence of land resulting in hydrological and surface impacts. The coal has already been mined by underground methods thus only the pillars remain which is extremely dangerous to extract from underground. 	Subsidence: Significance: Moderate Duration: Permanent Probability: High Reversibility: None Irreplaceable loss: Yes	Geotechnically not possible to recover any more coal than has already been removed due to shallow nature of old underground coal mine.	Geotechnically not possible



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
			and vibration impacts on surface.	<ul style="list-style-type: none"> Subsidence will potentially result in a total loss of catchment yield over the mined area. Inability to remove complete mineral resource. Technically intensive. Higher operational cost. 			
Filter cake	P2a	Stockpile for use as non-select product.	<ul style="list-style-type: none"> Possible revenue stream, and possibility to blend with product, as necessary. Less carboniferous waste disposed of on site. 	<ul style="list-style-type: none"> Contaminated runoff from the filter cake stockpiles may contaminate water resources. Potential combustion hazard. Contaminated runoff from the filter cake stockpiles may contaminate water resources. 	Surface water contamination: Significance: Moderate - High Duration: Long-term Probability: High Reversibility: None Irreplaceable loss: Yes	Good possibility that the filter cake can be sold.	✓
	P2b	Disposal	<ul style="list-style-type: none"> Limited handling of filter cake, thereby reducing 	<ul style="list-style-type: none"> Disposal will create long term source of 	Water contamination:		✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
			contamination risk during transport.	contamination for water resources. <ul style="list-style-type: none">Inefficient use of potentially valuable resource.	Significance: Moderate - High Duration: Long-term Probability: High Reversibility: None Irreplaceable loss: Yes		
Disposal of carboniferous wastes (wash plant waste rock and possibly filter cake)	P3a	Disposal to surface waste disposal facility-located on old rehabilitated mine area.	<ul style="list-style-type: none">Close to plant – low cost option.Area already disturbed- i.e. brownfields.Carboniferous material easily accessible should there be a future change in technologies and mineral demands.	<ul style="list-style-type: none">Future permanent dump on surface.Differential settling on rehabilitated surface may compromise any foundation liner/barrier (if required)-Alt P3a only.AMD seepage if not lined.Potential long term runoff of contaminated water as well as contaminated seepage emanating from the disposal facility.	Water contamination: Significance: Moderate - High Duration: Long-term Probability: High Reversibility: None Irreplaceable loss: Yes Acid Mine Drainage: Significance: High	Topsoil is very limited at Vlakvarkfontein and may not be enough to cover additional dumps	✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
				<ul style="list-style-type: none"> Long term – permanent environmental risk/liability associated with future dump integrity (e.g. erosion of cap-illegal mining). 	Duration: Long-term Probability: High Reversibility: Limited Irreplaceable loss: Yes		
	P3b	Disposal to surface waste disposal facility-located on un-mined area.	<ul style="list-style-type: none"> Opportunity to line the storage facility and reduce contamination. Carboniferous material easily accessible should there be a future change in technologies and mineral demands 	<ul style="list-style-type: none"> Further disturbance of surface. Potential of spontaneous combustion AMD seepage if not lined. Potential runoff of contaminated water as well as contaminated seepage emanating from the disposal facility, reduced natural cover in catchment resulting in water quality and hydrological impacts to local water resources. 	Acid Mine Drainage: Significance: High Duration: Long-term Probability: Moderate Reversibility: Limited Irreplaceable loss: Yes Surface disturbance: <i>Significance: High</i>	Very little un-mined land available for such a facility	✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
					Duration: Permanent Probability: Moderate Reversibility: Moderate Irreplaceable loss: Yes		
		P3c	Disposal of wash plant waste rock to pit and filter cake to surface disposal site. <ul style="list-style-type: none"> Not sterilising a portion of land from future development 	<ul style="list-style-type: none"> Potential groundwater contamination and seepage emanating from the pit and disposal facility subsequently resulting in surface water contamination. The presence of two separate sources of contamination will be more difficult to manage. 	Ground water contamination due to seepage: Significance: Moderate - High Duration: Long-term Probability: Moderate Reversibility: None Irreplaceable loss: Yes	Both material types are carboniferous – according to the mine engineer there is no reason to use two different disposal facilities.	No reason to use two different disposal facilities
		P3d	Disposal of discard and filter cake to pit. <ul style="list-style-type: none"> Reduce final void size. Limited addition to pit salt load if 	<ul style="list-style-type: none"> Leaching to water resources (if disposed above groundwater level). 	Ground water contamination from leaching or seepage:	Most ideal option, no new dump on surface and assist with rehabilitation volumes	✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
			<p>disposed below pit water level.</p> <ul style="list-style-type: none"> Rehabilitation of the pit to ground level thereby reducing hydrological and soil impacts. 	<ul style="list-style-type: none"> Potential groundwater contamination and seepage emanating from the pit subsequently resulting in surface and ground water contamination. Limitations and technical challenges related to options for barrier layers. 	<p>Significance: Moderate - High</p> <p>Duration: Long-term</p> <p>Probability: Moderate</p> <p>Reversibility: None</p> <p>Irreplaceable loss: Yes</p>	– according to mine engineer.	
Old underground workings - Dewatering options	P4a	Pump-treat-discharge.	<ul style="list-style-type: none"> Reduce impact on groundwater system because smaller surface volumes to drive pollution plumes. Longer before post-mine floods; longer before decant treatment. Positive impacts resulting from the discharge of good water quality allowing for the proliferation of 	<ul style="list-style-type: none"> Need very large treatment system to permit timeous dewatering of workings. No buffer facility for future water requirements. Potential water quality impacts if discharge of poor quality. In addition, water quantity impacts (altered flows) may also negatively affect 	<p>Potential water quality impacts</p> <p>Significance: Moderate - High</p> <p>Duration: Long-term</p> <p>Probability: Moderate</p> <p>Reversibility: None</p> <p>Irreplaceable loss: Yes</p>		✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
			<p>more sensitive organisms downstream. Discharge of water may also serve to support wetland areas associated with the discharge point.</p> <ul style="list-style-type: none"> Water will contribute to the catchment yield. 	<p>local water resources.</p> <ul style="list-style-type: none"> Treatment facility will be designed for peak flows-i.e. over engineered. River baseflows will increase. This may have negative consequence in the dry season as the river systems are designed for lower base flows. This may also temporarily affect the river system i.t.o. river bank stability and hydrodynamics due to increased flow velocities. 	<p>River baseflow increase:</p> <p>Significance: Moderate</p> <p>Duration: Medium-term</p> <p>Probability: Moderate</p> <p>Reversibility: None</p> <p>Irreplaceable loss: Yes</p>		
	P4b	Pump-store (in existing penstock area)-treat-discharge.	<ul style="list-style-type: none"> Allow for consistent treatment. Penstock area gives a buffer capacity during peak pumping times. Increased retention times can result in 	<ul style="list-style-type: none"> If too full, it will serve as driver for contaminant plume to south. Potential water quality impacts if discharge of poor quality. Potential risk in storage of 	<p>Potential groundwater contamination</p> <p>Significance: Moderate - High</p> <p>Duration: Long-term</p>	<p>This is ideal to balance the amount of water to be treated and the amount to be pumped to the PCD for plant use and dust suppression.</p>	✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
			<p>improved water quality of discharged water.</p> <ul style="list-style-type: none"> Water treatment plant capacity can be optimized resulting in more efficient operations. Seasonal discharge variations and instream flow requirements could be accommodated if there is enough capacity in the existing penstock area. 	<p>large quantities of contaminated water (spillage). In addition, water quantity impacts (altered flows) may also negatively affect local water resources.</p> <ul style="list-style-type: none"> Greater surface area of disturbed land resulting in additional impacts. 	<p>Probability: Moderate</p> <p>Reversibility: None</p> <p>Irreplaceable loss: Yes</p> <p>Water quality impacts (altered flows)</p> <p>Significance: Moderate - High</p> <p>Duration: Long-term – Permanent</p> <p>Probability: Moderate</p> <p>Reversibility: Low</p> <p>Irreplaceable loss: Yes</p> <p>Surface disturbance: <i>Significance: High</i></p> <p>Duration: Permanent</p>		



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
					Probability: High Reversibility: Moderate Irreplaceable loss: Yes		
Wash plant water supply	P5a	Water obtained from dirty water containment facilities (e.g. penstock storage area, PCD's etc).	<ul style="list-style-type: none"> Assist to reduce water to be treated. Reduced use of clean water thus reducing overall water impact. This will reduce the risk of surface water discharge. 	No significant disadvantages or impacts identified at this stage.			✓
	P5b	Water from ground or surface water resources (e.g. borehole abstraction).	No significant advantages identified	<ul style="list-style-type: none"> Clean ground water resources to be used for potable water in village and on mine. Very little groundwater resources available. Negative impacts to water resources in the catchment through hydrological alteration 	Impact on water resources through hydrological alteration: Significance: High Duration: Permanent Probability: Moderate Reversibility: Low		Not enough groundwater and expected negative hydrological impacts



Alternative Category		Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
					(reduction in water availability).	Irreplaceable loss: Yes		
Technology Alternatives	Coal Beneficiation - Washing processing technology	T1a	Dry processing	<ul style="list-style-type: none">Reduce water need of mine.Same as crusher plant – no need to get IWULA.Dispose waste into mine similar to mining process.Reduced risk for water contamination from spills during processing and overall reduced water impact footprint.	<ul style="list-style-type: none">This process cannot separate near density material.Technology for high volumes dry separation not available/ cost effective.	N/A	Tests were done and a bulk sample of 60tonnes was transported to s dry plant facility near Belfast. The tests were unsuccessful	Dry processing tests proved unsuccessful.
		T1b	Wet washing	<ul style="list-style-type: none">Can control separation at specific densities.Well controlled process.Can be used to offset a positive water balance if one does exist.	<ul style="list-style-type: none">Need water.Increased risk for water contamination arising from the storage, usage and conveyance of contaminated water.	Impact on water balance and therefore on water resources: Significance: High Duration: Permanent	This is the best method to control the products required	✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
				<ul style="list-style-type: none"> Can result in a negative water balance requiring significant make-up water. 	Probability: High Reversibility: Low Irreplaceable loss: Yes Surface and ground water contamination: Significance: Moderate - High Duration: Long-term Probability: High Reversibility: None Irreplaceable loss: Yes		
Coal product transport options	T2a	Road	<ul style="list-style-type: none"> Flexible to deliver to any market(e.g. power stations). Limited anticipated soil, aquatic and wetland impacts- 	<ul style="list-style-type: none"> Dust impacts due to vehicle entrainment will be higher than conveyor and rail option. Road safety and traffic impacts. 	Dust Creation: Significance: High Duration: Long-term		✓



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
			existing road network.	<ul style="list-style-type: none"> Damage to local and regional road infrastructure. 	Probability: Moderate Reversibility: Low Irreplaceable loss: No		
	T2b	Rail	<ul style="list-style-type: none"> Siding close by. Low dust impact. 	<ul style="list-style-type: none"> Limited flexibility to deliver to different markets. Contaminated runoff from the siding resulting in contamination of surface and groundwater resources and subsequently negatively affecting the wetlands and aquatic ecology. 	Surface and ground water contamination: Significance: Moderate - High Duration: Long-term Probability: Moderate Reversibility: None Irreplaceable loss: Yes	Vlakovarkfontein Colliery currently delivers to Eskom and not all Power Stations have train tippers/offloading facilities.	Not practical
	T2c	Use of conveyor	<ul style="list-style-type: none"> Low dust impact. 	<ul style="list-style-type: none"> Customer need to be very close to plant. Limited flexibility to deliver to different markets. 	Surface disturbance leading to impacts on biodiversity:		Not practical



Alternative Category		Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
					<ul style="list-style-type: none">Potential additional soil, wetland and aquatic impacts associated with the construction of the conveyor.	Significance: Moderate - High Duration: Medium-term Probability: High Reversibility: Moderate Irreplaceable loss: Yes		
Activity Alternatives	Land-use Alternatives	A1	Land used for mining	<ul style="list-style-type: none">Economic advantages – continued employment for mine workers and creation of 15 new jobs.	<ul style="list-style-type: none">Potential for hydrological and chemical modification in local soils, wetlands and aquatic ecosystems.	Mining impacts identified above as well as in Section 9 of this report.	The Vlakvarkfontein mine is an already operational mine, continued mining at the site is considered the most feasible land use going forward unless environmental impacts associated with the expansion cannot be mitigated to acceptable levels	✓
		A2	Land used for farming	<ul style="list-style-type: none">Land will be restored to original use – grazing.	<ul style="list-style-type: none">Potential water quality, hydrological and soil impacts associated with	Soil impacts associated with farming:	Much of the entire mining area was only used for grazing since there is very little	Sub-optimal land use



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
		(cultivation/livestock)	<ul style="list-style-type: none"> Reduced risk for water contamination and subsequent wetland and aquatic ecological degradation. 	livestock agriculture. This includes nutrient input from livestock as well as the physical alteration of the watercourse banks.	<p>Significance: Moderate - High</p> <p>Duration: Long-term – Permanent</p> <p>Probability: Moderate</p> <p>Reversibility: Moderate</p> <p>Irreplaceable loss: Yes</p> <p>Hydrological impacts associated with farming (alteration of watercourses):</p> <p>Significance: Moderate - High</p> <p>Duration: Long-term – Permanent</p> <p>Probability: Moderate</p> <p>Reversibility: Low</p>	topsoil to facilitate crop growing.	



Alternative Category	Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
					Irreplaceable loss: Yes		
	A3	No-go alternative	<ul style="list-style-type: none"> Reduced risk for water contamination and subsequent wetland and aquatic ecological degradation. Reduced risk to the health and safety of the local communities. 	<ul style="list-style-type: none"> Agricultural and residential activities will likely take place if the no-go alternative is followed. This may result in potential impacts to soils, wetlands and aquatic ecology. 	Similar to impacts for farming activities due to the fact that agricultural and residential activities will likely take place if the no-go alternative is followed		✓
Location Alternatives	S1a	Maximum mining over entire area	<ul style="list-style-type: none"> Stand-alone coal basin. Mining all coal in basin. Most infrastructure on mined out areas or on to-be-mined areas. 	<ul style="list-style-type: none"> Unregulated, buffer insensitive mining can result in permanent impacts to soil, wetland habitats as well as downstream aquatic ecosystems. 	Ecological impacts due to surface disturbance, however this alternative will only be considered if the on-site investigations reveal no areas on site of particular concern or sensitivity.	The possibility of maximum mining will be considered in the EIA phase if the on-site investigations reveal no areas on site of particular concern. If no-go areas are identified then this alternative will be discarded.	✓



Alternative Category		Ref	Alternative description	Advantages	Disadvantages / Impacts / Risks	Extent, Duration and Significance of potential impacts for each alternative	Additional Comments	Carried forward into EIA?
		S1b	Sensitivity-based approach (avoid / buffer sensitive areas).	<ul style="list-style-type: none"> The avoidance of wetland and riverine areas and the preservation of a buffer zone can assist in the regulation of potential water quality impacts and reduce ecosystem degradation overall. 	<ul style="list-style-type: none"> Less mining area for the expansion therefore making project less economically viable and profitable. 	No significant impacts apart from economic impact on mine.		✓



7 STAKEHOLDER ENGAGEMENT

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation and aims to ensure that all relevant Interested and Affected Parties (I&APs) are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the proposed project needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with international best practise options;
- Compliance with national legislation;
- Establish and manage relationships with key stakeholder groups; and
- Encourage involvement and participation in the environmental study and authorisation/approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Provide an opportunity for I&APs to obtain clear, accurate and comprehensible information about the proposed activity, its alternatives or the decision and the environmental impacts thereof;
- Provide I&APs with an opportunity to indicate their viewpoints, issues and concerns regarding the activity, alternatives and / or the decision;
- Provide I&APs with the opportunity to suggest ways of avoiding, reducing or mitigating negative impacts of an activity and enhancing positive impacts;
- Enable the Applicant to incorporate the needs, preferences and values of I&APs into the activity.
- Provide opportunities to avoid and resolve disputes and reconcile conflicting interests.
- Enhance transparency and accountability in decision-making.
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent environmental impacts associated with the project.

The PPP for this project has been undertaken in accordance with the requirements of the MPRDA and NEMA, in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project.

7.1 LEGAL COMPLIANCE

The PPP must comply with the several important sets of legislation that require public participation as part of an application for authorisation or approval; namely:

- The Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 - MPRDA);
- The National Environmental Management Act (Act No. 107 of 1998 - NEMA);
- The National Environmental Management Waste Act (NEMWA, Act No. 59 of 2008); and
- The National Water Act (NWA, Act No. 36. Of 1998).

Adherence to the requirements of the above-mentioned Acts will allow for an Integrated PPP to be conducted, and in so doing, satisfy the requirement for public participation referenced in the Acts. The details of the Integrated PPP are provided below.



7.2 GENERAL APPROACH TO PUBLIC PARTICIPATION

The PPP for the proposed Vlakvarkfontein Coal Mine Extension has been undertaken in accordance with the requirements of the MPRDA, NWA and NEMA, in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&AP's are afforded an opportunity to comment on the project.

7.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

The Interested and Affected Parties (I&AP) databases compiled from various past environmental authorisation processes have been updated to compile a new register of key I&AP's identified for notification of the Environmental Authorisation Application. The I&AP database includes, amongst others; landowners, communities, regulatory authorities and other specialist interest groups. A full list of I&APs is attached in Appendix B.

7.3.1 LIST OF AUTHORITIES IDENTIFIED AND NOTIFIED

The following Government Authorities were notified of the proposed project:

- Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
- Mpumalanga Department of Economic Development and Tourism
- Mpumalanga Department of Health
- Mpumalanga Department of Human Settlement
- Mpumalanga Department of Mineral Resources
- Mpumalanga Department of Public Works, Roads and Transport
- Mpumalanga Department of Social Development
- Mpumalanga Department of Water and Sanitation
- Mpumalanga Lakes District Protection Group
- Mpumalanga Landbou/Agriculture
- Mpumalanga Tourism and Parks Agency
- National Department of Agriculture, Forestry and Fisheries
- National Department of Environmental Affairs
- National Department of Mineral Resources
- National Department of Rural Development and Land Reform
- National Department of Water and Sanitation
- Nkangala District Municipality
- South African National Roads Agency Limited (SANRAL)
- South African Local Government Association (SALGA)
- Eskom
- Transnet SOC Limited
- Victor-Khanye Local Municipality
- Emalahleni Local Municipality



7.3.2 OTHER KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

The following Key Stakeholders have been identified and notified of the proposed project:

- Birdlife South Africa;
- Wildlife & Environmental Society of South Africa (WESSA);
- AFGRI;
- Agri SA Mpumalanga;
- South African National Biodiversity Institute (SANBI);
- Homeland Mining & Energy SA (HMESA);
- Endangered Wildlife Trust;
- GroundWork;
- Centre for Environmental Rights;
- Federation for a Sustainable Environment;
- Arbor Community Forum;
- Arbor Steering Committee; and
- Wilge Forum.

7.4 INITIAL NOTIFICATION OF I&AP'S

The PPP commenced on the 7th of August 2017 with an initial notification and call to register for a period of 30 days, ending on the 11th of September 2017.

7.4.1 REGISTERED LETTERS, FAXES, AND EMAILS

Registered Letters, emails and facsimiles were composed and sent to the identified authorities, adjacent landowners, ward councillors and registered I&APs of the proposed Vlakvarkfontein Coal Mine Extension Project. The notification letters include the following information:

- List of anticipated activities to be authorised;
- Scale and extent of activities to be authorised;
- The duration of the activity;
- Sufficient detail of the intended operation to enable I&AP's to assess/surmise what impact the activities will have on them or on the use of their land);
- The purpose of the proposed project;
- The exploration methods to be used;
- Details of the affected properties (including a locality map);
- Details of the MPRDA, NEMA and NWA Regulations that must be adhered to;
- Date by which any request to register as an I&AP must be forwarded through to EIMS; and
- Contact details of the EAP.



In addition, a questionnaire was included in the registered letters, emails and facsimiles sent and requested the following information from I&AP's:

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions;
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity;
- To provide information on current land uses and their location within the area under consideration;
- To provide information on the location of environmental features on site, to make written proposals as to how and to what standard the impacts on site can be remedied.
- To mitigate the potential impacts on their socio-economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied;
- Details of the landowner and information on lawful occupiers;
- Details of any communities existing within the area;
- Details of any Tribal Authorities within the area;
- Details of any other I&AP's that need to be notified;
- Details on any land developments proposed;
- Details of any perceived impacts to the environment that should be considered in the Scoping an EIA Reports; and
- Any specific comments or concerns regarding the proposed mining extension application.

Proof of the registered letters, emails and facsimiles that were sent out during the Initial Notification Phase are attached in Appendix B.

7.4.2 BACKGROUND INFORMATION DOCUMENT

Included in the I&AP notification letters, facsimiles, and e-mail is a Background Information Document (BID). The BID includes the following information:

- Project name;
- Applicant name;
- Project location;
- Map of affected project area;
- Description of the exploration right application process;
- Information on document review;
- A detailed questionnaire;
- I&AP registration form; and
- Relevant EIMS contact person for the project.

Please refer to Appendix B for proof of the BID issued to I&AP's.



7.4.3 ONE-ON-ONE CONSULTATION

Further to the site notice and poster placement, one-on-one consultation with the community was undertaken whereby EIMS visited each household in Arbor and its surroundings to individually distribute the notification letter and BID's. The one-on-one consultation involved presenting the documents as well as a verbal explanation of the project and the EIA and public participation processes. The consultations were undertaken in the language of choice of the community member (mostly in isiZulu). Furthermore, the community members were given an opportunity to provide comment and/or express their concerns regarding the proposed project. All comments received were recorded and are included in the issues/comments and responses section of this report. A summary of issues is included in Table 15: Summary of issues raised during consultation process below.

Table 15: Summary of issues raised during consultation process

Name	Issues	Aspect
Nomfundo (D123E)	Concerned about what happens to occupiers if the house they are living in is already owned by someone who was previously moved. Are occupiers included in the potential move or will they be excluded from the opportunity to have a permanent place to live.	Moving Housing
Grace (D116)	Concerns regarding the mem that was sent to the mine on the 1 st of August 2017. The community was expecting a response by the 16 th of August 2017 but none was provided. Concerns around blasting and the effects it has on their houses. Many people's houses have already been damaged from blasting and now it will be damaged more. Moving houses is desirable as if they as moved they will be moving to a single stand and they have invested money into building their own space.	Blasting Housing
Vinolia(C114)	She was told she's being moved. Concerns around blasting and that the negatives of the extension will outweigh the positives.	Blasting Benefits
Ivy Molialose (B59)	Relocation concerns	Relocations
Mama Mokoena	Not allowed heating in her houses. It gets very cold. They are not given coal for heating or cooking and they are not allowed to buy coal. Requested that we visit her for public meetings as she does not move around much.	Public Meeting Heating
Emma Ntuli (C18)	Apart of the elderly community.	Electricity



Name	Issues	Aspect
	House has no electricity	
Sindisiwe (C18)	They are already experiencing problems with blasting.	Blasting
Sabethe Vilakazi(B36)	<p>Complaints about the mine not responding to their concerns. The mine made numerous promises when it initially started and nothing has been done.</p> <p>Concerns about access to water- they have to walk down the road to get water. There have been talks about the mine installing a water system. Would like to know if it is still happening.</p> <p>They built a relationship with their contact at the mine who has moved to Manungu so they now have to start from scratch with a new person who doesn't know the issues they have been discussing.</p>	Water General
Stiso Masllela (No7)	<p>Dust is a concern. The water suppression truck only comes around noon and sometimes he doesn't see it.</p> <p>Cracks in houses.</p> <p>Traffic impact on the livestock. Livestock gets knocked cause the drivers don't follow the speed limits.</p> <p>Focus groups to be held as the youth does not give everyone a chance to speak.</p> <p>They used to receive coal from the mine.</p>	Cracks Dust Traffic Focus Group Meeting
Samuel Sindane (A73)	<p>Blasting and dust fallout.</p> <p>Water interruption</p>	Dust Blasting Water
Nomoi (C55)	Dust, Blasting and Cracks in the house	Dust Blasting Cracks
Lucia Ngwenya (C63)	Dust Blasting	Dust Blasting
Vusi (B50)	Concerns with the vibrations of the blasting and the effects on his house.	Blasting
M. Niawgu (C52)	Dust Cracking of houses	Dust Cracks
John Magga (No number yet- was previously moved)	Was previously moved but the new house does not have the gardens he previously had. The new houses are basically just structures with no facilities eg. no water connections	New housing Basic Facilities



7.4.4 NEWSPAPER ADVERTISEMENTS

Three advertisements, as detailed in the table below, describing the Mining Right amendment and EA Application process have been placed in newspapers with adequate circulation in the area. Table 15 contains details of adverts placed thus far.

Table 16: Details of adverts placed

Newspaper	Language(s)	Date/ Issue
Mpumalanga Provincial Eqazette	English	2 nd August 2017
Streeknuus	English and Afrikaans	Vol. 24 No. 2837 (4 th August 2017)
Highveld Delmas Chronicles	IsiZulu	Issue 30 (4 th to 10 th August 2017)

The newspaper adverts included the following information:

- Project name;
- Applicant name;
- Project location;
- Description of the Environmental Authorisation Application process;
- Legislative requirements; and
- Relevant EIMS contact person for the project.

I&AP's were provided a period from the 7th of August 2017 to the 11th of September 2017, to register as I&AP's for the proposed project.

7.4.5 SITE NOTICES

Six (6) site notices (English, Afrikaans and isiZulu) were placed along and within the perimeter of the proposed project area on 04 August 2017. The on-site notices included the following information:

- Project name;
- Applicant name;
- Project location;
- Description of the Environmental Authorisation Application process;
- Legislative requirements; and
- Relevant EIMS contact person for the project.

Please refer Appendix B for proof of site notice placement.

7.4.6 COMMUNITY MEETING

A Focus Group meeting was held on 27 July 2017 with the community leaders from Arbor, representatives from Mbuyelo, and the social study specialists. The purpose of the meeting was to explain the proposed



Vlakovarkfontein coal mine extension project with the community leaders to determine the best methods of engaging with the community. The minutes of the meeting are attached in Appendix B of this Scoping Report.

7.5 NOTIFICATION OF AVAILABILITY OF SCOPING REPORT

Notification regarding the availability of this Scoping Report for public review has been given in the following manner:

- Registered letters with details on where the scoping report is available from, as well as the public review comment period, were distributed to all registered I&APs (which includes key stakeholders and surrounding landowners);
- Facsimile notifications with information similar to that in the registered letter described above, were distributed to all registered I&APs; and
- Email notifications with a letter attachment containing the information described above were also distributed to all registered I&APs.

The scoping report was made available for public review from 19 October 2017 until 20 November 2017 for a period of 31 days.

7.6 PUBLIC MEETING

A scoping phase public meeting is scheduled for early November 2017. The main objectives of each of the said meetings is to share available information with the I&APs, and to provide the I&APs with the opportunity to ask questions, raise potential issues and concerns, and make comments on the proposed project.

7.7 ISSUES AND REPONSES

Issues raised to date have been addressed in a transparent manner and included in the Issues and Responses Report (Appendix B). below including an indication of where these are addressed in the report or a response to the raised issue.



8 ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section of the draft Scoping Report provides a description of the environment that may be affected by the proposed Vlakvarkfontein Mine Extension project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. Use of baseline information from the EMPR compiled by Geovicon Environmental (Pty) Ltd is acknowledged as well as baseline information provided in the mine's current IWWMP compiled by Geo Soil and Water. Additional information is sourced from recent water and dust monitoring reports completed by Geo Soil and Water and The Biodiversity Company as well as the 2011 heritage survey completed for the mining right area by PGS Heritage.

8.1 LOCATION

The Vlakvarkfontein Colliery lies approximately 17 km east of Delmas in the Mpumalanga Province, south of the N12, within the Victor Khanye Local Municipality which forms part of the Nkangala District Municipality. The area has been significantly affected by historical mining. Vlakvarkfontein Mine commenced during early 2010, and the first coal blasting activities commenced on 27 May 2010. The Vlakvarkfontein Colliery falls within the Witbank Coal Field of which the No 2 and No 4 coal seams occur on the property. A land use map showing surrounding land uses is provided in Figure 20.

8.2 TOPOGRAPHY

The proposed mining area is situated in the Western Highveld section of Mpumalanga. This area is characterised by a gently undulating plateau with fairly broad to narrowly incised valleys such as the Wilge River valley. The general elevation of the area ranges between 1 500 mamsl and 1 644 mamsl. The highest elevation (1644.3 mamsl) forms the crest of a gentle rising slope approximately 4.5 km southeast of the mining. This high ground also serves as a watershed boundary for the Leeuwfonteinspruit (aka Kromdraaispruit) and Klipspruit (Heuwelfonteinspruit) catchments.

Vlakvarkfontein Coal Mine falls within the both the northern and southern watershed, which feeds both the Leeuwfonteinspruit and the Heuwelfonteinspruit, tributaries of the Wilge River. The Leeuwfonteinspruit and the Heuwelfonteinspruit occurs to the south and north of the proposed mining area respectively at elevations of ± 1520 mamsl. The topography of the area immediately adjacent to the proposed mining area has been heavily impacted upon by the construction and operation of the Spoornet railway line, Arbor Siding, Arbor Settlement; semi rehabilitated and unrehabilitated mining areas.

The mining area itself has a gentle to slightly steep slope in the south towards the Leeuwfonteinspruit and a gentle slope towards the railway line to the north. The mining area has the highest elevation of 1569 mamsl with the lowest point occurring in the southern portion of the property at an elevation of 1525 mamsl. A topographical map is included as Figure 16.

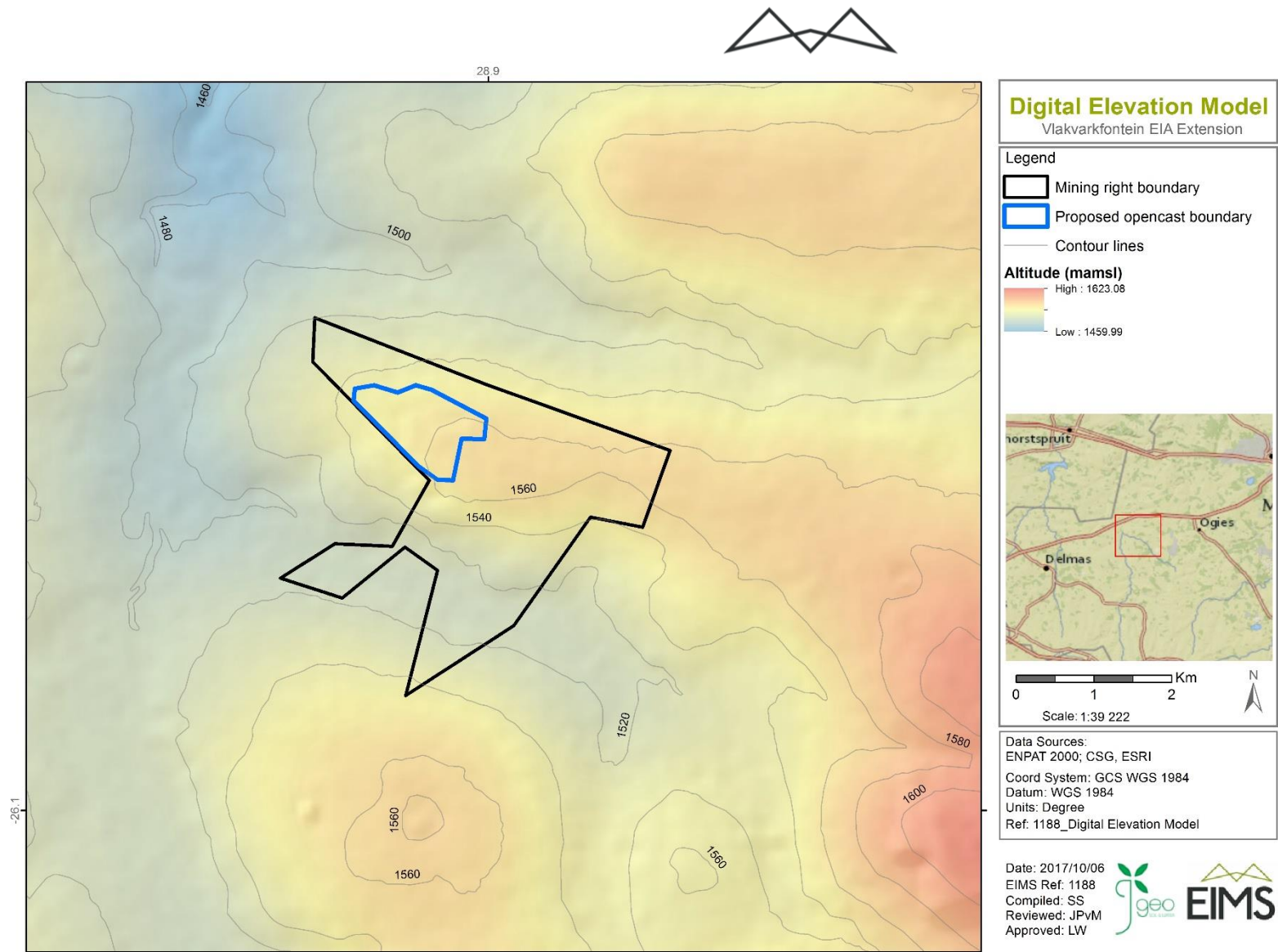


Figure 18: Topography Map



8.3 CULTURAL AND HERITAGE RESOURCES

A heritage assessment for the current mining right area was undertaken by PGS Heritage in 2011. The study area proves to be a rich cultural landscape based on a variety of activities and events that have taken place in the farm Vlakvarkfontein 213-IR both in the past and in the present. The study area is highly disturbed from various anthropogenic activities that have taken place in the past. These activities include among others: agriculture (e.g. cattle farming), mining (e.g. coal mining) and settlement (e.g. farmsteads, shops, grave burials etc). Mining activities in the mining right area date back as far as 1903. North-west, south and east of the current mining right area, and outside the study area, are old mines.

One of the most important towns in the region from a cultural and historical perspective is Delmas located about 30 km west of the site. Most of the farms around Delmas specialise in maize farming and production. Other farms in the area specialise in wheat, potatoes, chicken and beans production. Other than agricultural activities, Delmas is also known for its coal mines - collieries dating back as far as the 1800s and early 1900's.

In 2014 PGS Heritage was appointed by Ntshovelo Mining Resources (Pty) Ltd to undertake the relocation of eight graves on Portion 5 of the Farm Vlakvarkfontein 213 IR, which would be negatively affected by the implementation of mining activities on that property. The graves in question were to be adversely affected by the development of infrastructure and mining activities for the Vlakvarkfontein Coal Mine. The specific area where the graves were located was to be used for mining, necessitating the relocation of the graves. All the disinterred remains were reburied in the Dawn Memorial Park Cemetery, Phola, Emalahleni. Apart from these graves, no significant heritage resources were noted in the 2011 heritage assessment conducted for the mining right area.

No detailed palaeontological information is currently available for the site. Information on the palaeontology of the area will be presented in detail in the EIA report once the Paleontological Impact Assessment has been concluded. According to the SAHRA palaeontology map the site does fall into an area of very high paleontological sensitivity.

8.4 SOCIO-ECONOMIC

The Vlakvarkfontein Coal Mine is situated in the Victor Khanye Municipality area. The area within which the mine is situated is called Arbor (local name taken from the nearby Arbor siding). The population density in the local area where Vlakvarkfontein Colliery is located is limited to residents of the Arbor settlement, as well as farmers and their workers. The area of influence includes the Nkangala District Municipality and the greater Victor Khanye Local Municipality as well as the Emalahleni Local Municipality. The most affected stakeholders are the adjacent commercial farmers and more directly, the Arbor Community.

The Arbor community is located adjacent to the mine. The mine owns the land on which the Arbor community reside. There are about 300 households that occupy this land, but this is expanding continually. It is unclear exactly how long the community has been occupying the land. There have been riots and violent protests in the past, and the relationship between the mine and the community has been volatile. The Centre for Environmental Rights (CER), the Human Rights Commission (HRC) and the Department of Mineral Resources (DMR) have been involved by the community, and there are significant sensitivities around community relations and impacts. Since Ntshovelo Mining has taken over the operations, an effort has been made to improve relationships between the mine and the Arbor community. This has resulted in frequent meetings between the mine and the community, represented by the Steering Committee and the Forum.

8.4.1 DEMOGRAPHICS AND EMPLOYMENT STATISTICS

In 2011 the total population of the Victor Khanye Local Municipality was 75 452 people and in 2001 it was 56 335. This indicates a gradual increase taking place in the municipality (Victor Khanye IDP 2016/2017). Unemployment level has been reduced from 28.2 to 21.6 in terms of Global insight figures this reduction is as a results of an increase in investments in our local economy. The employment situation is expected to improve over the medium term with additional jobs expected in the mining sector. The latest statistic reflects that the employment level in the Victor Khanye Local Municipality is currently at 28, 9%. Based on the 2016 definition of Economically Active Population (EAP) of 30,415 the unemployment rate is reflected at 21.6, this represents an overall gain in employment compared to 2011. This figure is high when we consider the economic activity in the area, but obviously impacted by the migration influx of job seekers. Leading industries in employment comprise of Trade (18, 7%), Agriculture (18, 2%) and Community Services contributing



(14, 3%). However, the former two sectors are experiencing a decline in employment in the last few years whilst Community Services has increased and Mining as an employer has grown and now contributes 12, 7%.

8.4.2 MINING AND INDUSTRY

The local economy is relatively diversified with the largest sector, in terms of output as well as proportional contribution being the trade sector. The growing sector is trade sector followed by the agriculture sector and the mining sector. During recent years the total output of the agriculture sector experienced significant levels of growth while the mining and minerals sector declined. Mining activities are concentrated mainly on coal and silica. As mentioned, about 3 million metric tons of coal and 2 million metric tons of silica are mined annually in the municipality. The main mining areas are around Delmas in the centre of the municipal area, and also in the far north-eastern corner of the municipal area. Importantly, there is a growing urgency to establish an equitable and realistic trade-off that maximizes the provincial benefits from mining and energy sectors while mitigating any environmental impacts. According to the MPGDS, the mining, petrochemicals, steel and forestry sectors are dominated by a few global-level companies, with relatively few job opportunities being created due to their intensive capital nature (Victor-Khanye IDP).

8.4.3 TRANSPORTATION, INFRASTRUCTURE AND TRAFFIC

The social infrastructure within the area surrounding the proposed mine, including the Arbor informal settlement is limited to farm stalls, isolated farm shops and farm schools. The Arbor informal settlement has a public primary school which used to be a farm school. No formal water supply is available in the immediate vicinity of Vlakvarkfontein Colliery. Water is obtained from groundwater boreholes and surface water dams for domestic and agricultural use. The entire rural area is serviced with electricity from a Eskom supply network. Power to Vlakvarkfontein Colliery will be sourced from a power line that runs along the eastern boundary of the mining area.

8.5 GEOLOGY

The Vlakvarkfontein Colliery area is situated in the Witbank Coalfield of the well-known Middle Ecca stage Coal Province. Several coal mines have been, or are operating within this coalfield. The Witbank coalfield extends from Springs in the west to Belfast in the east and from Middelburg in the north to Rietspruit in the south. The Witbank Coalfield includes the districts of Benoni, Nigel, Brakpan/Springs, Delmas, Dryden, Bronkhorstspuit, Kendal, Ogies, Witbank, Middelburg, Arnot and Belfast encompassing a surface area of approximately 568 000 ha. The Witbank Coalfield bounds Highveld coalfield to the south, the South Rand coalfields to the southwest and the Ermelo coalfields to the southeast. The coal seams of the Witbank coalfield are at a shallow depth with the lowest seam seldom reaching 100 metres in the deepest tying parts of the field. Due to erosion of the sediments, all that remains of the Karoo System in this area is that portion from the lower part of the Middle Ecca Stage to the Dwyka tillite. Within the Witbank coalfield, the Karoo System unconformably overlays the Witwatersrand System, the Waterberg System and the Bushveld Igneous Complex.

The strata in which the coal seams (Middle Ecca Stage) occur consist predominantly of fine, medium and coarse-grained sandstone with subordinate mudstone, shale, siltstone and carbonaceous shale. Ideally there are seven coal seams with varying degrees of persistence numbered from below as No. 1, No. 2, No. 3, No. 4 lower, No. 4 upper, No. 4 A and No. 5 Seams. The layers of carbonaceous shale are usually confined to the beds between the No. 2 and No. 4A Seams, with a glauconite sandstone marker present immediately above the No. 4A Seam.

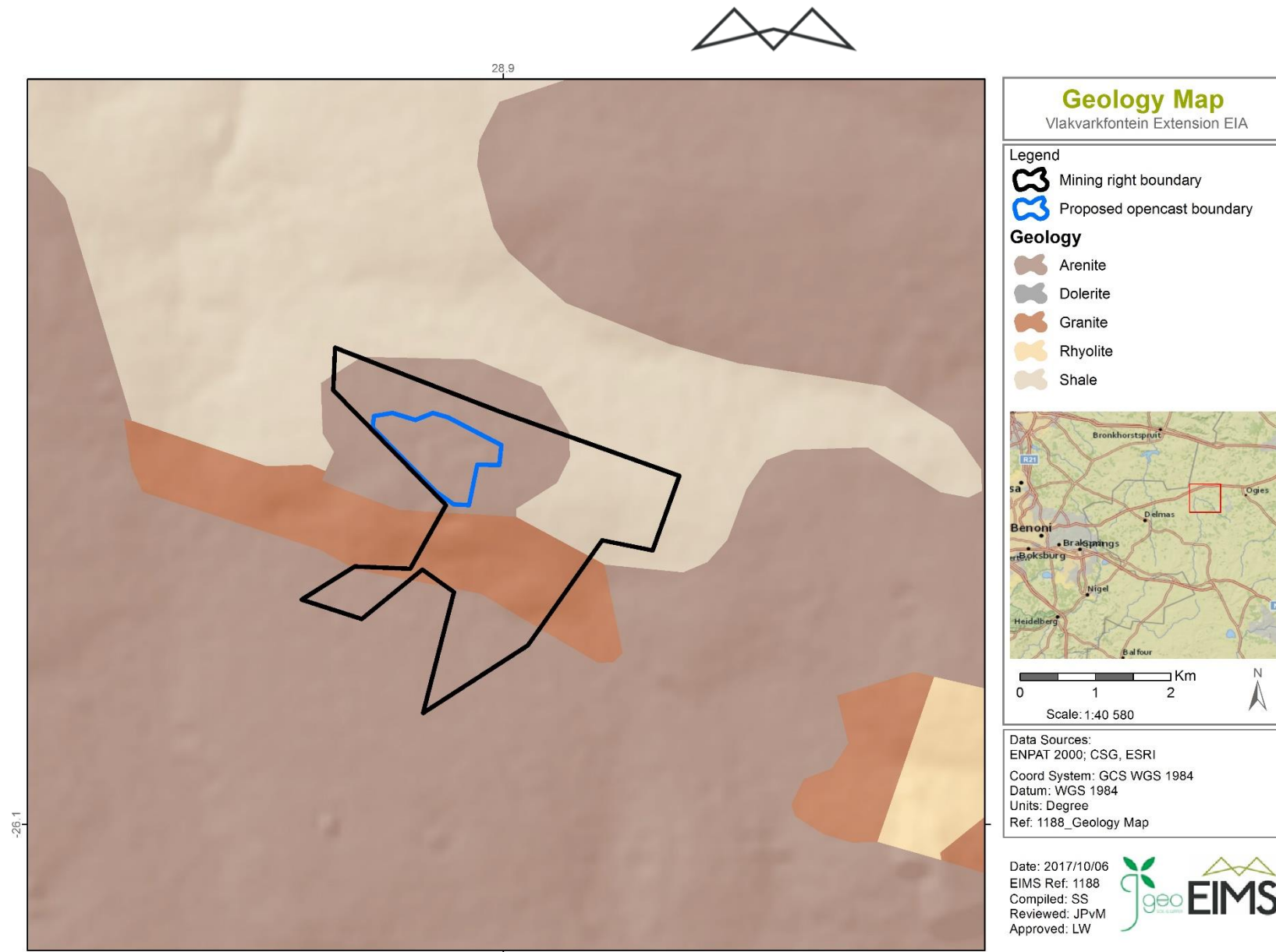


Figure 19: Regional Geological Map



8.6 CLIMATE

The climate is typical of the Highveld, with warm summers and cold winters with occasional severe frosts. Rainfall typically occurs as high intensity short duration thunderstorms. The mean annual temperature is 22.5°C, with recorder extremes of -11°C and 34°C. Delmas normally receives about 575mm of Rain per year while Ogies receives about 5693mm annually. The latest recorded data from the annual dust fallout monitoring report for Vlakvarkfontein mine indicate a yearly average of 677.5 mm of rainfall for the Emalahleni area.

Owing to the location of the site, the gentle undulating topography and the non-existence of mountain ranges and ridges, limited localised wind systems (topographically-induced) will be generated. Hence the wind patterns at the mine will typically conform to the regional wind patterns. Wind speed and direction summary for Emalahleni (January 2016 to March 2016) is provided in Table 16.

The mine is situated in the Highveld zone, characterised by summer hailstorms. These hailstorms per annum occur between mid-November and mid-April in the Witbank area. Thunderstorms occur frequently during summer (rainy season) and are usually accompanied by lightning, heavy rain, strong winds and occasional hail. Storms are localised and rainfall can vary markedly over short distances. Frost occurs in the winter months.

Table 17: Wind speed and direction summary for Emalahleni (January to December 2016)

Period	Average Wind Speed (m/s)	Dominant Direction
Jan-16	2.99	East
Feb-16	2.88	West
Mar-16	2.48	North and East
Apr-16	2.25	Northwest
May-16	2.37	Northeast
Jun-16	2.18	Northwest
Jul-16	2.77	Southwest
Aug-16	2.81	Northwest
Sep-16	3.30	Northwest
Oct-16	3.74	North and East
Nov-16	3.27	North and Northeast
Dec-16	2.25	West

8.7 SOILS, LAND USE AND LAND CAPABILITY

The proposed mining at Vlakvarkfontein Coal Mine has a potential to directly impact on the soils of the area. In this regard, it is important that the pre-mining condition of the soils within the mining area be determined. This will then be used as a baseline information for the proposed mining project and will be used to audit the mine's rehabilitation programme.

The only available soil survey information for the site was completed during the 2008 – 2009 Environmental study completed by Geovicon for the current mine. Four soil forms were identified over the study area and included the



Glencoe, Clovelly, Dresden and Mispah soil forms. Soil depths between the different soil forms vary between 20cm to 120cm. Based on this, it can be concluded that the soils are of both shallow and deep nature over the survey area with the Glencoe and Clovelly being the deeper soil forms and the Dresden and Mispah soil forms being the shallower soil forms.

Soils of the Glencoe form consist of a brownish unstructured loamy-sand Orthic A-horizon with a 30 cm vertical thickness. The Orthic A-horizon overlies an Apedal BI-horizon. The Apedal BI-horizon is a dark yellowish-brown unstructured mesotrophic (medium leached) sandy-loam subsoil horizon with a vertical thickness of 60 cm. The BI-horizon overlies a dark yellowish-brown Hard Plinthic B2horizon. The Orthic A-horizon overlies an Apedal BI-horizon. The Apedal BI-horizon is a dark yellowish-brown unstructured mesotrophic (medium leached) sandy-loam subsoil horizon with a vertical thickness of 90 cm. Soils of the Dresden form consist of a brownish unstructured loamy-sand Orthic A-horizon with a 20 cm vertical thickness. The A-horizon overlies a dark yellowish-brown hard Plinthic B2-horizon. Soils of the Mispah soil form consist of a very dark-greyish unstructured sandy-foam Orthic A Horizon with a vertical thickness of 20 cm. The Orthic A-Horizon overlies a whitish hard rock. An updated soil survey will be completed as part of the EIA report.

8.7.1.1 LAND CAPABILITY

Land capability potential of each soil map unit was established in correlation to soil physical properties during the studies for the EMP as part of the original environmental studies for the mine in 2009. The major differentiating factor was found to be soil depth, with the deeper units classified as having arable potential. The land capability for the Vlakvarkfontein Coal Mine mining area is indicated in Table 17.

Table 18: Land Capability over Vlakvarkfontein Coal Mine Mining Area

Soil Form	Land Capability Class	Soil depth (cm)	Topsoil depth (cm)
Glencoe	Crop production/grazing	90	30
Clovelly	Crop production/grazing	120	30
Dresden	Grazing	20	20
Mispah	Grazing	20	20

8.7.1.2 LAND USE

The current land use of the property is mining. Cultivation exists around the mining area and should not be affected by the proposed mining operation. Google Earth imagery indicates that the area immediately west of the mine was cultivated as recently as 2013. An informal settlement (Arbor settlement) exists to the north and northwest of the proposed mining area. This settlement also occurs on portion 5 of the farm Vlakvarkfontein 213 IR. Evidence of overgrazing and unrehabilitated mining is found within the greater study area. The semi and unrehabilitated mining areas, unlawful re-mining and exposure of these area to erosion has contributed to soil erosion, contamination of soils, decanting of mine affected water and wattle tree invasion. A land use map is presented in Figure 18.

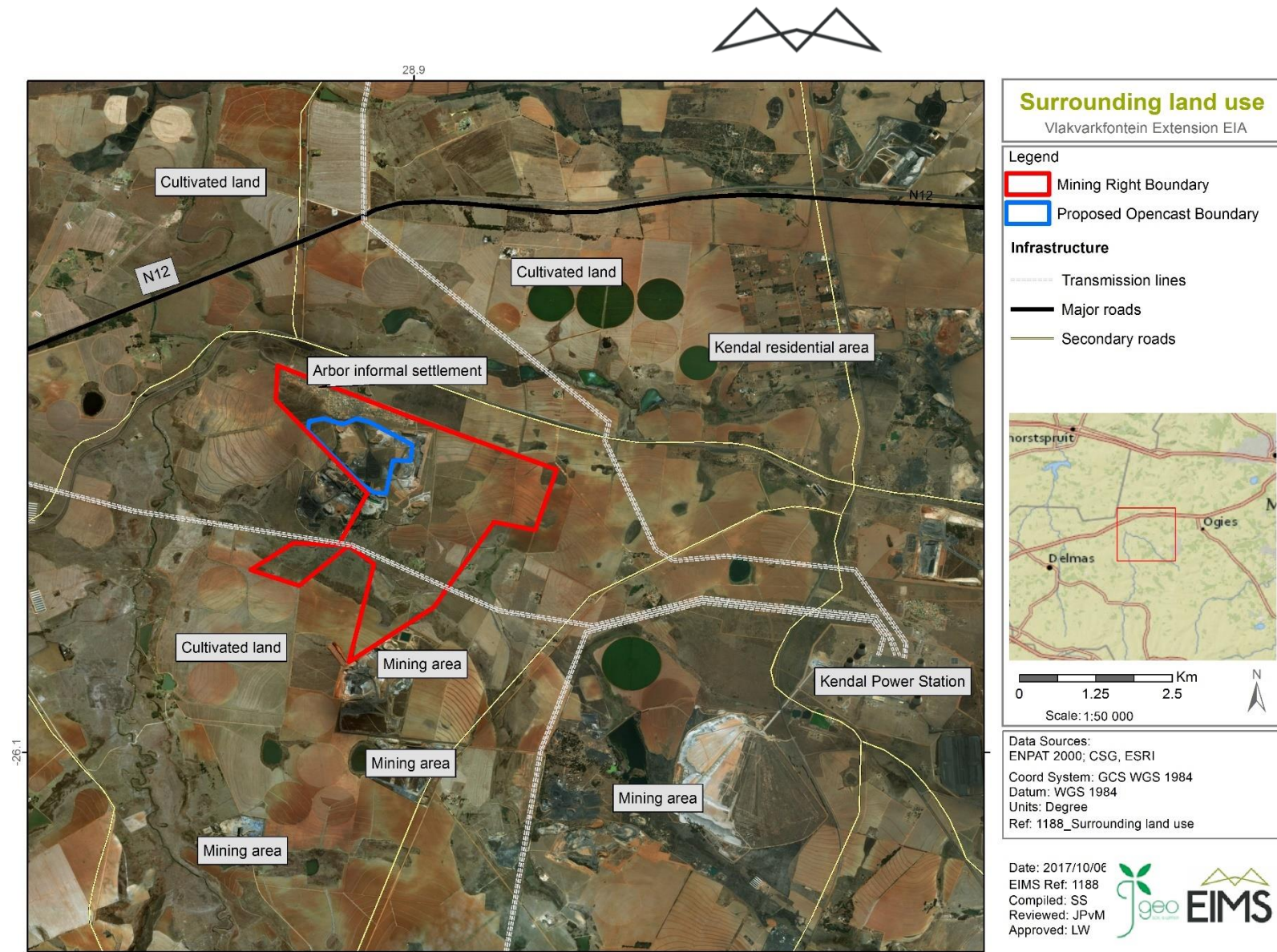


Figure 20: Surrounding Land Use Map



8.8 FLORA

The project area lies within the Grassland biome, one of nine biomes in South Africa. This is the second largest of South African biomes, covering approximately 30% of the country. The grassland biome has come under major threat in South Africa due to a number of key impacts. The Vlakvarkfontein Colliery lies within the Eastern Highveld Grassland according to the Mucina and Rutherford (Mucina and Rutherford, 2006). The Eastern Highveld Grassland vegetation unit is found in the Gauteng and Mpumalanga Provinces at altitudes of 1520m-1780m and at times as low as 1300m and is characterised by undulating plains, low hills and pan depressions. The vegetation is dominated by typical Highveld grasses (Figure 21) such as *Aristida*, *Digitaria*, *Eragrostis* and *Themeda* species. Woody plants include White Stinkwood Common Hook-Thorn and Protea sp. The vegetation unit is considered endangered, as more than 44% has been altered by agricultural practices, mining and urbanisation in the area. The protection of the vegetation is low with the target set at protecting 24% in 2006, as reported by Mucina and Rutherford (2006), the loss of the vegetation since then is considerable with developments growing over the years. The area is being used predominantly for agriculture and mining.

Alien invasion within the project area was regarded as moderate and is considered to potentially become a major hindrance to biodiversity should Alien vegetation be allowed to pervade. A number of Alien vegetation species were identified in the 2016 Alien Vegetation Management Plan for the existing mine. 18 Of the species identified within the area are listed within the Alien Vegetation Species Regulations within the National Environmental Management; Biodiversity Act (Act 10 of 2004) (NEMBA) and 12 as Category 1b. A map showing all Critical Biodiversity Areas (CBAs) is included in Figure 19.

In terms of the Mpumalanga Biodiversity Conservation Plan the site falls mostly within areas of “Least Concern” and areas of “No Natural Habitat”. The “Least Concern” areas have biodiversity value in the form of natural vegetation cover. Although they are not currently required to meet biodiversity targets, they do contribute significantly to functioning ecosystems, including ecological connectivity. The “No Natural Habitat” category covers the areas in which natural vegetation has been lost. It includes all land transformed by urban / industrial development and cultivation. These landscapes have only residual or negative effects on the functioning of natural ecosystems.



Figure 21: Photo taken at the site indicating the typical vegetation in the study area

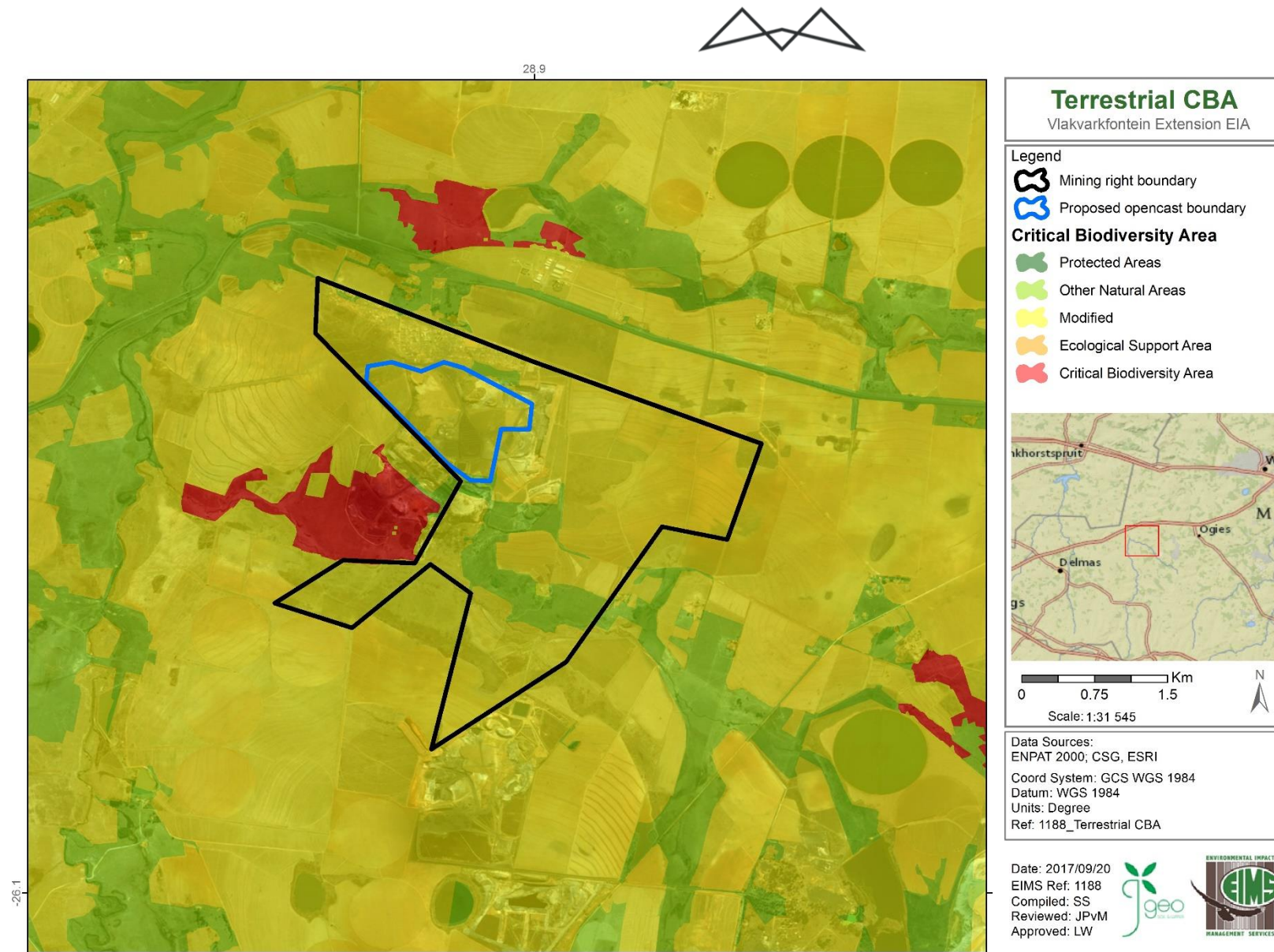


Figure 22: CBA Map



8.9 FAUNA

The area within and surrounding the Vlakvarkfontein Coal Mine is characterised by intensive agricultural (maize production and grazing), mining (semi rehabilitated mine), industrial (Spoornet railway and Arbor Siding) and residential (Arbor informal settlement) uses. Due to the intensity of the above-mentioned uses the wildlife habitats in the area have been severely affected.

It is highly unlikely that large animal species would permanently inhabit the site since the nearby siding and informal settlements have been in existence for a number of years. However, the Heuwelfonteinspruit and Leeuwfonteinpruit, located to the north and south of the mining area respectively could provide suitable habitat and corridor functionality for smaller animal species (e.g. rodents, scrub hare), birds, reptiles and amphibian species. In addition, the patches of wattle trees in the area could also provide habitat to some mammals and birds.

The study site represents two distinct bird communities according to the Southern African Bird Atlas Project 2 database. The first consists of a community pertaining to the numerous wetland features which is dominated by Red-knobbed Coot, Southern Red Bishop, Little Swamp Warbler and Red-billed Teal. The second consist of a grassland community dominated by *Zitting Cisticola*, taxa pertaining to the genus *Streptopelia* (doves) and a number Ploceid weavers (weavers and bishops). There are 12 Red listed species that could utilise the study site based on their respective breeding, roosting and foraging requirements.

Research has indicated that the Mpumalanga Province supports a high faunal diversity, including 163 mammal species, of which 98 species fall into the small mammal category. Mpumalanga is faunally very diverse, and accounts for about 65% of the mammalian species found in South Africa. The Province hosts four species that are provincially endemic (3 species of golden moles and 1 species of bat), seven that are South African endemics (4 species of golden moles, 1 species of mole-rat, 1 other rodent species and 1 species of primate), two taxa endemic to South Africa & Lesotho (1 golden mole & 1 antelope) and one taxon (antelope) endemic to South Africa, Lesotho & Swaziland (Insights into Biodiversity Conservation within Mpumalanga). Due to the relatively developed nature of the site, limited threatened or endangered fauna is anticipated to be found there. More details will be provided in the EIA assessment once detailed specialist studies have been completed.

8.10 SURFACE WATER

The Leeuwfonteinpruit and Heuwelfonteinspruit, which drain the proposed mining area runs along the southern and northern boundary of the proposed mine respectively. Both these streams discharge into the Wilge River some kilometres west of the mining area. Both the streams have their headwaters upstream of the mining area to the east and south east of the mining area. A power station and several opencast and underground mining operations occurs upstream of the proposed mining area.

A number of impoundments have been erected within the affected streams, which are in the form of farm dams, mined out opencast pits, mine pollution control dams and power station water storage dams. Two sub-catchments of the Wilge River (Leeuwfonteinpruit and Heuwelfonteinspruit sub catchments) were identified as being potentially affected by the proposed mining project. These sub-catchments cover an area of approximately 196.6 km (Heuwelfonteinspruit: 70.4 km² and Leeuwfonteinpruit: 126.2 km²) and both discharge into the Wilge River some kilometres west of the proposed mining area. Both sub catchments are typical of the Highveld region with gentle to flattish slopes with scattered pans.

Three streams, near Vlakvarkfontein, are at risk of potentially being impacted on by the mining activities. These include the Wilge River, Klipspruit and Kromdraaispruit. The Wilge River flows in a northerly direction past Vlakvarkfontein between the Vaal - and Olifants Rivers. Several collieries have been identified upstream and should be considered, when assessing downstream water quality. The Klipspruit flows from a south-easterly to a north-westerly direction to join the Wilge River on the western side of Vlakvarkfontein. The Klipspruit passes closest to Vlakvarkfontein and is most likely to be impacted by the mine. Again, several potential sources of pollution were identified upstream and may contribute to downstream water quality. The Kromdraaispruit flows from an easterly to a westerly direction, approximately 1.4 km to the north of Vlakvarkfontein. Similar, to the Wilge River and Klipspruit, upstream activities have been identified, which may contribute to water quality in the downstream aquatic environment.



8.10.1 WATER MANAGEMENT AREA

According to DWS' water management areas delineations, Ntshovelo Mining Resources (Pty) Limited's Vlakvarkfontein Coal Mine mining right area falls within the Olifants water management area, delineated as water management area No, 4, which subsequently falls under the B Primary drainage area. The Olifants water management area is divided into four major river catchments i.e. the Elands River, Wilge River, Steelpoort River and Olifants River catchments. The Vlakvarkfontein Coal Mine falls within the Wilge catchment. Within the Wilge River catchment, the Vlakvarkfontein Coal Mine occurs within the B20 tertiary drainage region and B20E and B20F quaternary drainage regions, which is drained by the Leeuwfonteinspruit and the Heuwelfonteinspruit. The Leeuwfonteinspruit and the Heuwelfonteinspruit are tributaries of the Wilge River which eventually confluence with the Olifants River just upstream of the Loskop Dam.

8.10.1.1 MEAN ANNUAL RUNOFF

The size and Mean Annual Runoff (MAR) for the affected sub-catchments, taken as 10% of the annual precipitation, within which the Vlakvarkfontein Coal Mine occurs are indicated in Table 18 below.

Table 19: Catchment MAR for Sub-Catchments Within and around the Vlakvarkfontein Coal Mine Area

Catchment	Area (km ²)	MAR (10 ⁶ m ³)
Leeuwfonteinspruit sub-catchment	70.4	1.1120
Heuwelfonteinspruit sub-catchment	126.2	7.9516
Mining Area catchment	1.21	0.0764

8.10.1.2 SURFACE WATER QUALITY

Surface water quality within the two affected sub-catchments within which the Vlakvarkfontein Coal Mine occurs has been impacted on by current and previous uses which includes, agricultural practices (cultivation and grazing), mining (current and defunct mining) and power generation activities. Several mines, grazing and cultivated land and an Eskom Power Station occurs upstream of the proposed mining area.

In view of the above-mentioned activities, mining activities have potential to impact on the surface water environment, it is imperative that the water quality of the water bodies within and around the proposed mining area be monitored. These qualities will be used to determine the current conditions of the surface water environment, which will further be used for comparison purposes with water qualities during mining. This will in turn act as a measuring tool for the efficiency or inefficiency of the management measures to be undertaken during mining.

According to the latest 2016 annual monitoring reports for the existing mining operations, most chemical constituents at the Kromdraaispruit upstream and Kromdraaispruit downstream monitoring localities comply with the limits set out in the IWUL for surface water with the exception of Total Dissolved Solids (TDS) and SO₄ at the upstream monitoring point as well as elevated heavy metal concentrations. It is noted that the water quality of the Kromdraaispruit (Leeuwfonteinspruit) downstream monitoring locality is of better quality than that of the upstream point with an exception of elevated heavy metal concentrations.

The water quality at the Klipspruit (Heuwelfonteinspruit) upstream monitoring point, before Vlakvarkfontein, exceeded IWUL limits in terms of TDS, SO₄ as well as elevated concentrations of Al, Fe and Mn. The Klipspruit downstream monitoring points do not indicate a negative net impact, however also have elevated concentrations of heavy metals. The water quality of the downstream monitoring point in the Wilge River indicate signs of impacts when compared to the upstream monitoring point. It is therefore evident that the water quality from the Klipspruit confluence elevated several variable concentrations in the Wilge River. It is evident that surface water monitoring points for the Klipspruit Upstream, Klipspruit Downstream and Wilge River Downstream indicate signs of coal mine pollution as TDS, SO₄ and Al IWUL Limits were breached. According to the 2016 water monitoring reports the pollution is not caused by Vlakvarkfontein but rather from a source upstream of Vlakvarkfontein. This is also true for the Wilge River Downstream monitoring point as the Klipspruit coincides with the Wilge River near Vlakvarkfontein effectively polluting it.



8.10.2 SURFACE WATER USE

The surface water use within the affected sub-catchment takes place in the form of impoundments such as farm dams. Several perennial and non-perennial pans occur within the sub-catchments but are however far from the proposed mining area. It can thus be concluded that surface water within the sub-catchments especially near the proposed mining area are mainly used for agricultural purposes (livestock watering). It is also likely that the water is utilized by the nearby community for domestic purposes.

8.11 WETLANDS

Wetlands within the Mining Right area are predominantly associated with the Leeuwfonteinspruit and one decant point on the property. Permanent wetlands are predominantly associated with incised stream channels, farm dams or drainage channels. Seasonal wetlands are associated predominantly with shallow channels (i.e. such as non-perennial streams) and pans. An artificial wetland has been formed by decant water emanating from one of the defunct underground workings some two to three hundred meters southwest of the initial box cut. It must however be mentioned that the water from the decant point is of very poor quality. A map of all National Freshwater Ecosystem Priority Area (NFEPA) wetlands and rivers in the study area is included in Figure 20. All streams and wetlands occurring in the mining right area should be treated as sensitive landscapes.

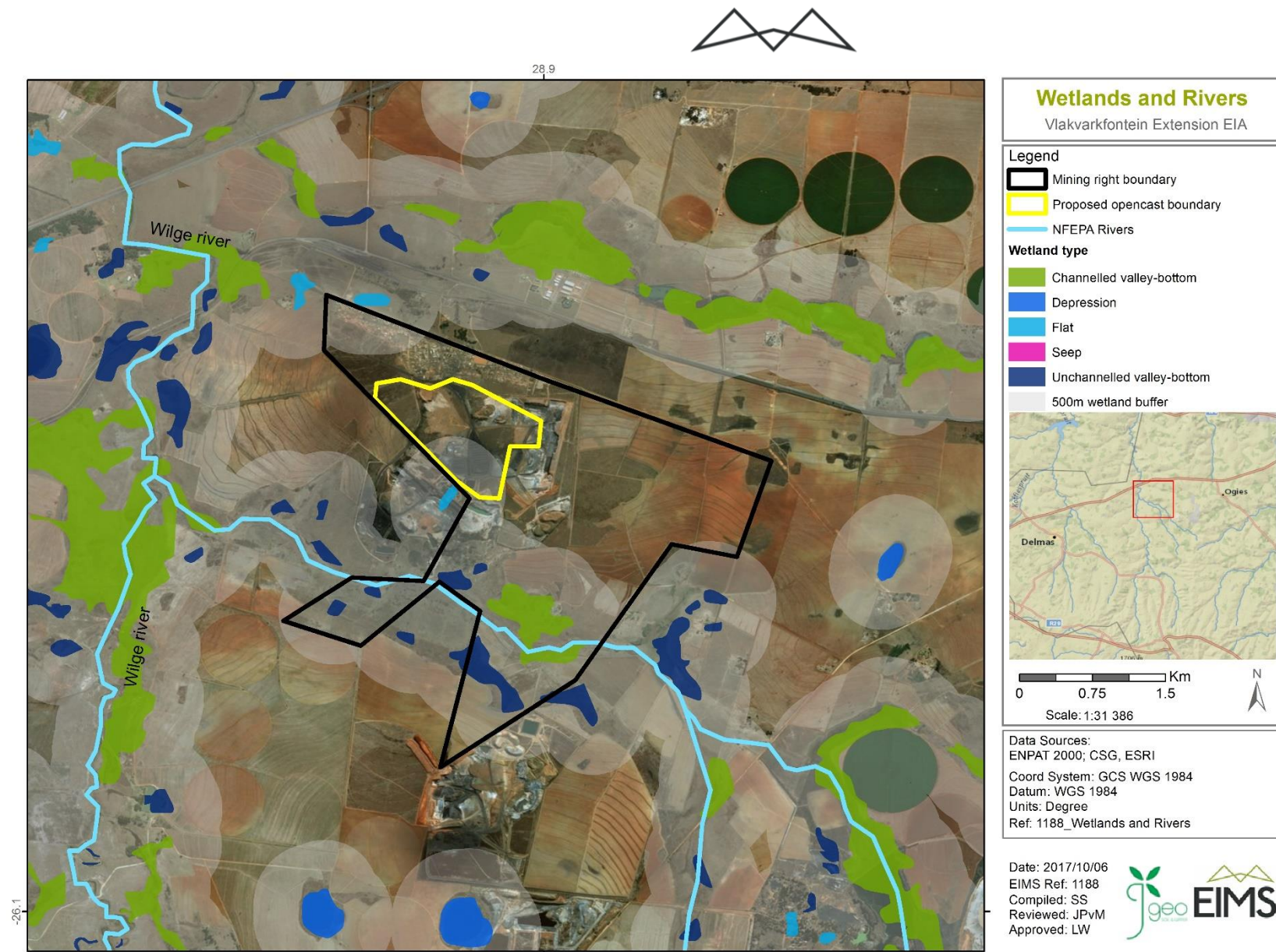


Figure 23: NFEPA rivers and Wetlands in the study area.



8.12 GROUNDWATER

Since mining activities can potentially impact on the groundwater, a description of the current groundwater conditions is required. The purpose of this section is, therefore to describe the prevailing groundwater conditions. This will serve as a reference baseline for quantifying potential mining impacts on the existing groundwater regime.

Depth of the groundwater table in the study area was determined by means of a 2016 hydrocensus conducted as part of the IWWMP update. From the data obtained it is evident that the groundwater depth varies across the site, mainly due to topography and heterogeneity of the secondary structures in the bedrock. Groundwater levels varying between 5m and 25m below ground level were measured during this survey. The relationship between the topography and static groundwater level can be used to distinguish between boreholes with water levels at rest and boreholes with anomalous groundwater levels due to disturbances such as pumping or local geohydrological heterogeneities.

Groundwater flow should be perpendicular to the above-mentioned contours and inversely proportional to the distance between contours. Groundwater flow is mainly from topographically high to low areas, eventually draining to local streams.

8.12.1 AQUIFER CHARACTERISATION

The aquifer within which all impacts of the Vlakvarkfontein Colliery is likely to be confined. Boundaries were chosen to include the area where the groundwater pollution plume could reasonably be expected to spread and simultaneously be far enough removed from mining boundaries to include the area that could be affected by groundwater abstraction in the mine. To the north and west streams act as boundaries. Groundwater flow is parallel to the streams and is thus unlikely to cross any streams under normal undisturbed conditions. In the south and south-east an upstream boundary was chosen due to the fact that drainage in the area is in a north-west direction and it can be expected that the groundwater flow is mainly from topographical high to low areas, eventually draining to local streams.

The following major groundwater aquifers were identified in and around the Vlakvarkfontein Colliery:

- Coal-Bearing Unit

The coal-bearing unit is the Vryheid Formation, Ecca Group, Karoo Supergroup. The Karoo-Ecca aquifers in the Highveld generally comprise a 1-8m deep upper layer of shallow overburden, followed by a 2m thick clay horizon. Beneath the clay horizon, there exist three aquifers of varying thickness: 1) shallow weathered zone aquifer, 20-35 m thick; 2) deep fractured aquifer, 60-80 m deep; and 3) a deep, non-fractured aquifer, below 80 m.

The depth of the Karoo-Ecca aquifer within the planned mining area varies from 1642 m, but averages at 35 m. The bottom of the sequence is formed by the 2-seam, with both the 2- and 4- seam being mined within this zone. Water strikes exist at both the top and bottom contacts of both coal seams, although more prolifically on the 4-seam contacts. Due to these similar hydraulic characteristics, the entire depth of the Karoo-Ecca aquifer within the mining zone was considered as the shallow weathered zone aquifer, although the number 2- and 4- coal seams were considered to have a slightly higher hydraulic permeability. Outside of the mining area, the Karoo-Ecca aquifers were considered to be less than 35 m thick due to the dome-shaped topography when compared to the flat number 2- and 4- coal seams.

- Dwyka Sediments

Sediments of the Dwyka group are situated beneath the Ecca Group, with fresh, non-weathered Tillite lying immediately beneath the 2-seam, which is expected to be at a lower permeability than the uppermost 4 m of this unit.

- Surrounding Geological Units



The local aquifer system described above is surrounded by various geological units, each with unique hydraulic attributes. Sedimentary Formations of the Transvaal sequence bound the area to the north and east while granitic rocks of the Bushveld Complex bound the area to the west and south. The Ogies dyke (orientation west-east) transects the area some 180 m to the south of the proposed open pit. Furthermore, post-Transvaal basal diabase sill outcrops were identified, as well as some alluvial deposition along the Klipspruit in the south.

It is generally accepted that permeability decreases with depth, with the fresh Dwyka and Dwyka Tillites being of a lower permeability than the Karoo-Ecca aquifer. The permeability of the different aquifers typically ranges over several orders of magnitude and no major continuous zones of preferential flow were identified.

The area earmarked for mining has a recharge value of 2.5 % of the mean annual precipitation (MAP), which equates to roughly 17.5 mm/a or 4.8×10^{-5} m/d. These values are based on previous hydrogeological assessments from surrounding coal fields, independent calculations and calibration of the numerical groundwater model. Natural chloride concentrations of the aquifers range from 1 mg/l to 4 mg/l, which are very low, and are indicative of a rainfall recharge greater than 10 %, however, these values are probably related to the movement of shallow groundwater in the aquifer system. This low residence time can be attributed to the depletion of the mineral resources which typically retard groundwater flow. It is believed that the seasonal variation of groundwater levels ranges from 2 m to 4 m as a result of rainfall recharge.

8.12.2 GROUNDWATER QUALITY

According to the Groundwater Resources Map of South Africa, the water in the area can be classified as being of type A. This means that the dominating cations are calcium (Ca^{2+}) and magnesium (Mg^{2+}) with the dominant anions being chlorine (Cl) and sulphate (SO_4).

Sulphate is probably the most reliable indicator of pollution emanating from coal mining. However, in the area under investigation, none of the groundwater samples did contain elevated concentrations of sulphate. Sulphate concentrations can however increase due to mobilisation during the mining process. Based on recent groundwater monitoring data, generally, water quality from the majority of the existing Vlakvarkfontein Mine groundwater monitoring points is of a good quality and complied mostly with the limits set in the IWUL. Elevated levels of NO_3 were observed at several monitoring localities. Elevated levels of NO_3 can be indicative of an external, anthropogenic impact. Other sources of NO_3 can include explosives as well as fertilizers. Several farming activities surround the monitoring localities. NO_3 concentrations will be closely monitored during following monitoring occasions.

According to the latest 2016 groundwater monitoring data from the mine, borehole groundwater monitoring points are of average to poor quality. Almost all active monitoring points exceed IWUL Limits in terms of pH while two other have exceptionally high concentrations of TDS and SO_4 .

Some of the boreholes that are located in the area of the 1930's and 1940's underground mining works, and boreholes to the northwest of Vlakvarkfontein, also indicate signs of pollution. Two of these groundwater monitoring localities indicate elevated concentrations of SO_4 and high heavy metal concentrations which can be an early sign of acid mine drainage.

8.12.3 HYDROCENSUS AND GROUNDWATER USE

The mine management ensures optimal use of available water resources in that no additional water is abstracted for the processes and operations taking place at the mine, other than the potable water used for human consumption.

In 2016 a surface water user hydrocensus was carried out around the proposed Vlakvarkfontein Colliery for up to 35 km downstream, where the Wilge River confluences with the Bronkhorstspuit River at the Premier Mine Dam. During this hydrocensus, a total of 17 users were recorded which is thought to cover approximately 65 % of the total water users. Most users interviewed were unsure of the amount of water they used from the river. In addition to irrigation, river water is used extensively for watering of livestock and game within this river segment. Approximately 12% of the riparian owners use the river for fishing and recreational activities in general. Drinking water for the nearby community is supplied by the mine.



8.13 AIR QUALITY

Potentially air pollution may arise because of particulates entering the atmosphere. These particulates arise as dust from haul roads, on overburden stockpiles, R.O.M and product stockpiles. Mining activities at the Vlakvarkfontein Coal Mine will occur on surface through opencast mining and thus these activities may have impact on surface air quality. The associated surface infrastructures are also potential sources of dust.

The site falls into the Highveld Priority Area (HPA). This area of South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occur due to the concentration of industrial and nonindustrial. The priority area covers 31 106 km², including parts of Mpumalanga Province. The burning of coal and wood for heating and cooking in residential areas on the HPA, mostly in the early morning and evenings, results in the release of particulates and other pollutants into the stable surface layer. High concentrations occur in these areas, particularly where housing is dense. Due to poor dispersion, the spatial effect of these emissions on air quality is generally quite limited. However, the number of residential areas in the HPA where wood and coal are used is significant and the additive effect of these predicted emissions on air quality concentrations is significant, particularly in Lesedi, Ekurhuleni and Delmas. The site is located within the Delmas SO₂ hotspot. None of the municipalities in the area have taken steps to develop an AQMP, with most waiting to follow the development of the HPA AQMP.

According to the latest 2016 dust monitoring reports, although monthly and annual averages reflect dust fallout mostly below the 2013 National Dust Control Regulation limits, it should be noted that individual dust occurrences caused by mining/blasting may cause uncomfortable and unpleasant experiences where human activities occur. It is typical that these individual occurrences give close by residents the perception that the mine causes very high dust fallout on a regular basis. Hence the importance of regular dust suppression on all mining areas and transportation routes used for all mining activities.

Fugitive Greenhouse Gas (GHG) emissions from coal mines may impact on air quality. In a 2013 report from Coaltech titled "Fugitive greenhouse gas emissions from South African coal mines" the total GHG emissions were calculated for all coal mines in the country. For surface mining the emissions of greenhouse gases are generally dispersed over sections of the mine and are best considered area sources. These emissions may be the result of seam gases emitted through the processes of breakage of the coal and overburden, low temperature oxidation of waste coal or low-quality coal in dumps, and uncontrolled combustion. Only the 1970 tons per annum (tpa) methane emissions from coal seams are reportable, giving a total CO₂e emission for surface coal mines of approximately 0.049 Mtpa per year.



9 ENVIRONMENTAL IMPACT ASSESSMENT

This section aims to identify and assess the potential environmental impacts associated with the proposed Vlakvarkfontein coal mine extension. This impact assessment will be used to guide the identification and selection of preferred alternatives, and management and mitigation measures, applicable to the proposed activities.

9.1 APPROACH AND METHODOLOGY

This section presents the proposed approach to assessing the identified potential environmental impacts with the aim of determining the relevant environmental significance.

9.1.1 METHOD OF ASSESSING IMPACTS

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations. The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

9.1.2 DETERMINATION OF ENVIRONMENTAL RISK

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = (E + D + M + R) \times N$$

4

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 19.



Table 20: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure or natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact



Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 20.

Table 21: Probability Scoring

Aspect	Score	Definition
Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur).

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 22: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
Probability						

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 22.

Table 23: Significance Classes

Environmental Risk Score	
Value	Description
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),



≥ 17

High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

9.1.3 IMPACT PRIORITISATION:

In accordance with the requirements of Appendix 3(3)(j) of the NEMA 2014 EIA Regulations (GNR 982), and further to the assessment criteria presented in the Section above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision-making process.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 24: Criteria for Determining Prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).



The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 24. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (Refer to Table 24).

Table 25: Determination of Prioritisation Factor

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

To determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).



Table 26: Final Environmental Significance Rating

Environmental Significance Rating	
Value	Description
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ -10 < -20	Medium negative (i.e. where the impact could influence the decision to develop in the area).
≥ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
0	No impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

9.2 IDENTIFICATION OF IMPACTS

Potential environmental impacts were identified during the scoping process. These impacts were identified by the EAP, the appointed specialists, as well as the public. Table 26 provides the list of potential impacts identified.

Without proper mitigation measures and continual environmental management, most of the identified impacts may potentially become cumulative, affecting areas outside of their originally identified zone of impact. The potential cumulative impacts have been identified, evaluated, and mitigation measures suggested which will be updated during the detailed EIA level investigation.

When considering cumulative impacts, it is vitally important to bear in mind the scale at which different impacts occur. There is potential for a cumulative effect at a broad scale, such as regional deterioration of air quality, as well as finer scale effects occurring in the area surrounding the activity. The main impacts which have a cumulative effect on a regional scale are related to the transportation vectors that they act upon. For example, air movement patterns result in localised air quality impacts having a cumulative effect on air quality in the region. Similarly, water acts as a vector for distribution of impacts such as contamination across a much wider area than the localised extent of the impacts source. At a finer scale, there are also impacts that have the potential to result in a cumulative effect, although due to the smaller scale at which these operate, the significance of the cumulative impact is lower in the broader context.



Table 27: identified Environmental Impacts

Main Activity/Action/Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
Site preparation (Planning)	Vegetation clearance		<ul style="list-style-type: none"> Removal of threatened and protected species Loss/ Destruction of Natural Habitat Displacement of Faunal Species Flora Direct and Indirect Mortality Fauna Direct and Indirect Mortality 	<ul style="list-style-type: none"> Dust (health and nuisance impact) Safety and Security (i.e. access to properties, theft, fire hazards, etc.). Damage/ Disruption of services (i.e. water, electricity, etc.). Impact on Existing Infrastructure (i.e. roads, fences, etc.). 	<ul style="list-style-type: none"> Disturbance/Destruction of Archaeological Sites Disturbance/Destruction of Historic Buildings or Structures Disturbance/ Destruction of Graves and Cemeteries Disturbance/ Destruction of Unmarked Graves
	Removal of infrastructure				
	Planned placement of infrastructure				
	Establishment of construction contractor area				
Human resources management (Planning)	Employment/recruitment	<ul style="list-style-type: none"> Pollution/poor air quality, environmental hazards and damage, and the potential for these to impact on future generations. 		<ul style="list-style-type: none"> Perceptions and Expectations. Employment Opportunities. Inability of the community to capture economic benefits & Managing expectations. 	
	I&AP consultations				
	CSI initiatives				
	Skills development programmes				
	Environmental awareness training				
	HIV/AIDS Awareness programmes				
	Integration with Municipalities' strategic long term planning				
	Stripping and stockpiling of soils	<ul style="list-style-type: none"> Loss/ Disturbance of Topsoil (including contamination, erosion and compaction) 	<ul style="list-style-type: none"> Pollution of habitats 	<ul style="list-style-type: none"> Loss of agricultural resource Visual impacts 	<ul style="list-style-type: none"> Disturbance/ Destruction of fossils Disturbance/Destruction of Archaeological Sites
	Cleaning, grubbing and bulldozing				



Earthworks (Construction)	Removal of building waste and cleared vegetation	<ul style="list-style-type: none"> • Gaseous and particulate emissions; fugitive dust • Deterioration of water quality • Increase in the occurrence of alien invasive vegetation • Decline in habitat integrity • Loss of species sensitive to changes in water quality • Altered hydrological regimes • Contamination of Groundwater. • Surface Water Contamination. • Damage to Wetlands/ Drainage Lines. 	<ul style="list-style-type: none"> • Removal of threatened and protected species • Loss/ Destruction of Natural Habitat. • Habitat Fragmentation and Edge Effects. • Displacement of Faunal Species. • Blockage of Seasonal and Dispersal Movements. • Flora Direct and Indirect Mortality. • Fauna Direct and Indirect Mortality. 	<ul style="list-style-type: none"> • Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock 	<ul style="list-style-type: none"> • Disturbance/Destruction of Historic Buildings or Structures • Disturbance/ Destruction of Graves and Cemeteries. • Disturbance/ Destruction of Unmarked Graves
	Digging trenches and foundations				
	Blasting				
	Establishing storm water management measures				
	Establishment of firebreak				
Civil (Construction)	Works				
	Establishment of infrastructure and services	<ul style="list-style-type: none"> • Gaseous and particulate emissions; fugitive dust • Generation of PM_{2.5} and PM₁₀ • Gaseous and particulate emissions; fugitive dust. • Deterioration of water quality • Decline in habitat integrity • Loss of species sensitive to changes in water quality • Altered hydrological regimes • Decline in aquatic habitat integrity 	<ul style="list-style-type: none"> • Loss of primary vegetation communities. • Removal of threatened and protected species. • Loss/ Destruction of Natural Habitat. • Habitat Fragmentation and Edge Effects. • Displacement of Faunal Species. • Blockage of Seasonal and Dispersal Movements. 	<ul style="list-style-type: none"> • Loss of agricultural resource 	<ul style="list-style-type: none"> • Disturbance/Destruction of Archaeological Sites • Disturbance/Destruction of Historic Buildings or Structures • Disturbance/ Destruction of Graves and Cemeteries • Disturbance/ Destruction of Unmarked Graves
	Mixing of concrete and concrete works				
	Establishment of PCD and storm water/return water dam				
	Establishment of dewatering pipelines				
	Establishment of mobile office and ablution block				
	Sewage and sanitation				
	Establishment of fuel storage area				



		<ul style="list-style-type: none"> Establishment of chemical storage area Establishment of general waste area Access control and security General site management 	<ul style="list-style-type: none"> Impacts on wetlands Surface water contamination 	<ul style="list-style-type: none"> Flora Direct and Indirect Mortality. Fauna Direct and Indirect Mortality. Contamination of Groundwater. Altered Hydrological Regime. Loss of species sensitive to changes in water quality Surface Water Contamination. Damage to Wetland/ Drainage Line. Increase in the occurrence of alien invasive vegetation 		
Open-cast (Operation)	Mining	Drilling	<ul style="list-style-type: none"> Gaseous and particulate emissions; fugitive dust Greenhouse gas emissions Generation of PM2.5 and PM10 Gaseous and particulate emissions; fugitive dust. Deterioration of water quality Increase in the occurrence of alien invasive vegetation 	<ul style="list-style-type: none"> Loss of primary vegetation communities. Removal of threatened and protected species. Loss/ Destruction of Natural Habitat. Habitat Fragmentation and Edge Effects. Displacement of Faunal Species. 	<ul style="list-style-type: none"> Reduction in Quantity of Water (i.e. water consumption). Interference with Existing Land Uses. Nuisance and Impact on Sense of Place Damage/ Disruption of services (i.e. water, electricity, etc.). Noise impacts 	<ul style="list-style-type: none"> Disturbance/ Destruction of fossils. Disturbance/Destruction of Archaeological Sites. Disturbance/Destruction of Historic Buildings or Structures. Disturbance/ Destruction of Graves and Cemeteries. Disturbance/ Destruction of Unmarked Graves.
		Blasting				
		Excavations				
		Removal of overburden by dozing and load haul				
		Establishment of internal haul roads				
		Removal of ore				
		Establishment of RoM stockpiles				



	Establishment of Product Stockpiles	<ul style="list-style-type: none"> Decline in habitat integrity Loss of species sensitive to changes in water quality Altered hydrological regimes Impacts on wetlands Contamination of Groundwater Damage to Wetland/ Drainage Line Surface water contamination and soil contamination 	<ul style="list-style-type: none"> Blockage of Seasonal and Dispersal Movements. Flora Direct and Indirect Mortality. Fauna Direct and Indirect Mortality. Decline in aquatic habitat integrity Loss of species sensitive to changes in water quality Spontaneous combustion of carboniferous stockpiles. 	<ul style="list-style-type: none"> Impact on Existing Infrastructure (i.e. roads, fences, etc.). Employment Opportunities. Visual impacts. Vibration and blasting Coal supply for energy security. 	
	De-watering of old underground workings				
	Pumping of water to PCD				
	Waste rock dumps for backfilling				
	Soil management				
	Water management				
	Concurrent rehabilitation				
	Water treatment				
Infrastructure removal (Decommissioning)	Dismantling and demolition of infrastructure	<ul style="list-style-type: none"> Gaseous and particulate emissions; fugitive dust Generation of PM2.5 and PM10 Contamination of Groundwater. Damage to Wetland/ Drainage Lines 	<ul style="list-style-type: none"> Fragmentation and Edge Effects. Displacement of Faunal Species. 	<ul style="list-style-type: none"> Safety and Security (i.e. access to properties, theft, fire hazards, etc.) 	
	Blasting				
	Safety control				
Rehabilitation (Closure)	Backfilling of pits and voids	<ul style="list-style-type: none"> Contamination of Groundwater. Acid Mine Drainage Damage to Wetland/ Drainage Lines 	<ul style="list-style-type: none"> Fragmentation and Edge Effects. Displacement of Faunal Species. Fuel, waste, sedimentation. 	<ul style="list-style-type: none"> Reduction in future land capability. Safety risk to public 	
	Slope stabilisation				
	Erosion control				
	Landscaping				
	Replacing topsoil				



	Removal of alien/invasive vegetation				
	Re-vegetation				
	Restoration of natural drainage patterns				
	Remediation of ground and surface water				
	Rehabilitation of external roads				
Maintenance closure)	Initiate maintenance and aftercare program	<ul style="list-style-type: none"> • Fugitive dust • Damage to Wetland/ Drainage Lines • Treatment of extraneous water and long terms pollution potential • Potential impacts associated with residue stockpiles in the long term. 			
	Environmental aspect monitoring				
	Monitoring of rehabilitation				



9.3 DESCRIPTION AND ASSESSMENT OF IMPACTS

The following potential impacts were identified during the scoping phase assessment. As a result of the scoping phase assessment and the sensitivity mapping exercise, a preferred layout alternative will be identified and will be assessed further in the EIA phase assessment. These preliminary impact calculations will be subject to amendment based on the EIA phase assessment and the results of public consultation undertaken during the EIA phase. Refer to Appendix D for the assessment tables.

9.3.1 PRELIMINARY IMPACTS ON HERITAGE RESOURCES

This section presents the preliminary potential impacts identified regarding heritage resources. While several project phases exist, only impacts associated with the Site Establishment and Earthworks / Construction Phase are included here. The reason for this is that no impacts are anticipated on the identified heritage resources during the other phases of the project. A palaeontologist will be appointed during the EIA phase to address this aspect. A heritage study has already been completed for the study area.

The following construction phase preliminary impacts (as well as their impact rating) on heritage resources were identified during scoping:

A) Disturbance/ Destruction of Archaeological Sites or Historic Buildings

Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, Section 35).

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/ destruction of archeological sites or historic structures	Construction	-9.00	-3.00	-3.50

Proposed Preliminary Mitigation

During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases. The recorded localities of these archaeological sites as recorded on the heritage sensitivity maps should ideally be avoided during the placement of development footprint areas. These studies will be required to determine the significance of each site and to assess the possible development impacts on each of them during the Heritage Impact Assessment phase. An HIA was completed for the site in May 2011, this HIA will be included in the EIA report.

B) Disturbance/ Destruction of Graves and Cemeteries as well as Unmarked Graves

There is a possibility that cemeteries may be located within the study area. Any marked graves and cemeteries located within the development footprint areas will be confirmed once the development footprints are defined. Should graves and cemeteries be confirmed on site and within the preferred footprint, impact on these features will trigger various pieces of legislation that protect them. A survey was conducted in 2014 that covers the study area and several graves located on portion 5 of Vlakvarkfontein 213 were relocated. Based on this no further impacts on graves are expected as part of the project.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/ Destruction of Unmarked Graves	Construction	-9.75	-3.25	-3.25

Proposed Preliminary Mitigation

The recorded localities of these cemeteries as depicted on the heritage sensitivity maps should ideally be avoided during the placement of development footprint areas. Any marked graves and cemeteries located within the preferred development footprint areas will be identified during the archaeological walkthroughs of the footprint areas. Cemeteries and grave sites are protected by various legislations and the best option would be the in-situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

Cemeteries and grave sites are protected by various legislation and the best option would be social consultation with the former (or present) residents of this area to assess whether any such unmarked graves are located within the final study area for the Heritage Impact Assessment. This mitigation measure must be supported by archaeological monitoring of the development activities.

C) Disturbance/ Destruction of Fossil Material

There is a possibility that fossils could be encountered during excavation of bedrock within the development footprint. Unidentified paleontological resources and the discovery of such resources can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from the responsible heritage authority (NHRA, section 35).

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Disturbance/ destruction of fossils	Construction Operation	-12.00	-4.00	-5.33

Proposed Preliminary Mitigation

The mitigation measures recommended in the paleontological EIA-phase assessment must be adhered to.

9.3.2 PRELIMINARY IMPACTS ON ECOLOGY

The following preliminary impacts on the ecological resources within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on the ecological receiving environment have been identified that will occur during the Planning and Design Phase, Decommissioning Phase, and the Rehabilitation and Closure Phase. The removal of the vegetation cover on site and other disturbances may increase the erosion potential of the site. Since a large portion of the site is already disturbed by mining activities the erosion potential for these areas may increase moderately. The erosion potential for the rest of the site, including primary, secondary and wetland vegetation will however have a more significant increase with mining and construction activities. This impact can be mitigated. Increased erosion is expected adjacent to coal delivery routes that cross wetland habitats alter the drivers that affect wetland vegetation. Below are the construction and operational phase preliminary impacts on ecological resources identified during scoping, as well as their impact rating.



A) Loss/ Destruction of Natural Habitat and removal of protected species

The proposed activities on site will lead to localised damage to the open cast area. There will possibly also be damage to habitats associated with travelling along access routes. Several species listed as threatened under NEMBA and the South African Red Data list are potentially present on site. Should any of these species be found on site no mining activities may take place in or close to the habitat of the species until a permit is obtained for their removal. This may potentially have a moderate to high impact on the overall species numbers and distribution. There is, however, potential to mitigate this impact, through search and rescue operations and good soil rehabilitation practices.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss/ destruction of natural habitat	Construction	-15.00	-6.00	-8.00

Proposed Preliminary Mitigation

Undertake activities in previously disturbed places and/or habitats with a lower sensitivity score. Rehabilitate disturbed areas as soon as possible and control alien plants.

B) Habitat Fragmentation and Edge Effects

Due to the existing fragmentation of natural habitat, limited fragmentation and edge effects are expected.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Habitat fragmentation and edge effects	Construction	-6.5	-6.00	-7.00

Proposed Preliminary Mitigation

Undertake activities in previously disturbed areas and/or habitats with lower sensitivity. Where possible locate activities on the boundaries of existing disturbance. Use existing access roads as much as possible and rehabilitate disturbed areas as soon as possible.

C) Displacement of Faunal Species

The proposed activities on site will lead to localised damage to the environment and possibly also be damage to habitats associated with travelling along access routes to sites selected. Loss of faunal habitat may be of moderate significance.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Displacement of faunal species	construction operation	-8.25	-5.50	-6.42

Proposed Preliminary Mitigation

Where possible undertake activities in previously disturbed places and/or habitats with a lower sensitivity score and rehabilitate disturbed areas as soon as possible.



D) Blockage of Seasonal and Dispersal Movements

Proposed activities will result in some loss of habitat, especially migration corridors. Some habitat fragmentation is also expected.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Blockage of seasonal and dispersal movements	Construction Operation	-6.50	-6.00	-7.00

Proposed Preliminary Mitigation

Where possible undertake activities in previously disturbed areas and/or habitats with lower sensitivity. Where possible locate activities on the boundaries of existing disturbance. Use existing access roads as much as possible and rehabilitate disturbed areas as soon as possible.

E) Flora Direct and Indirect Mortality

There are various plant species of concern that could potentially be affected by the proposed activities on site. The exact location of these species is unknown until fieldwork has been completed by an ecologist for the EIA phase.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Flora Direct and Indirect Mortality	Construction	-13.00	-6.50	-9.75

Proposed Preliminary Mitigation

Where possible, walk-through survey of local site prior to activity to be undertaken. Search and rescue of species of concern (if any). Obtain permits for any listed/protected species found on site. Where possible undertake activities in previously disturbed areas and/or habitats with lower sensitivity. Where possible locate activities on the boundaries of existing disturbance, and use existing access roads as much as possible.

F) Fauna Direct and Indirect Mortality

There are risks to fauna, for example illegal hunting/poaching as well as threats from movement of machinery. During construction, relatively sedentary species may suffer direct mortality. The assessment is based on a worst-case

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Fauna direct and indirect mortality	Construction	-13.00	-6.50	-9.75

Proposed Preliminary Mitigation

Where possible undertake site-specific walk-through surveys for potential species of concern. Where possible undertake activities in previously disturbed areas and/or habitats with lower sensitivity; and Where possible locate activities on the boundaries of existing disturbance; Use existing access roads as much as possible.



G) Pollution of Habitats

There is a possibility that mining activities could result in pollution being introduced into natural habitats.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Pollution of Habitats	Construction	-11.25	-9.00	-12.00
	Operation			

Proposed Preliminary Mitigation

Manage all waste sources emanating from proposed activities in line with legal requirements. Maintain minimum distances from aquatic and wetland habitats as per legal requirements and where possible undertake activities in previously disturbed areas and/or habitats with lower sensitivity.

H) Introduction/ Invasion by Alien Species

Disturbing activities on site will favour alien plants in places.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Introduction/ Invasion by Alien Species	Operation	-12.00	-9.00	-12.00

Proposed Preliminary Mitigation

Where possible undertake activities in previously disturbed areas and/or habitats with lower sensitivity. Where possible locate activities on the boundaries of existing disturbance. Use existing access roads as much as possible and rehabilitate disturbed areas as soon as possible. Manage alien plants within close proximity to activities; and compile an alien plant management plan.

9.3.3 PRELIMINARY IMPACTS ON GEOHYDROLOGY

The following preliminary impacts on the geohydrological resources within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on the geohydrological receiving environment have been identified that will occur during the Planning and Design Phase and the Decommissioning Phase. Below are the preliminary impacts on geohydrological resources for the construction, operational, and rehabilitation and closure phases identified during scoping, as well as their impact rating according to the methodology described above.

The potential groundwater impacts were derived based on previous experience and literature review. The impacts shown take into account the worst-case scenario and may not happen at Vlakvarkfontein, however these impacts need to be considered during the EIA. It has been assumed that exploration at the mine has been completed and the first phase considered for the impact assessment was the construction phase.

During the construction phase the following potential impacts may result from the on-site activities:

- Potential site contamination of groundwater due to hydrocarbon spillages and leaks from construction vehicles;
- Slight reduction of recharge to groundwater due to the compaction of the ground surface; and
- Potential small-scale dewatering during the construction of the box-cut.



These activities pose site specific groundwater risks. During the operational phase of the mine the following potential impacts may result from the on-site activities:

- Reduction of groundwater reserves due to mine dewatering. This will result in the lowering of the surrounding groundwater levels and aquifer yield;
- Mine dewatering may result in the reduction of stream baseflow; and
- Contamination of the groundwater within the mine voids and as a result of seepage from overburden, discard material and coal stockpiles. The contaminant groundwater impact on the stream water quality on nearby streams.
- During the rehabilitation and closure phase of the mine the following potential impacts may result from the on-site activities:
- Contamination of groundwater due to continued oxidation of coal material in the mine void and the waste material on site; and
- Contamination of surface water due to decant from the mine void after rebound of the water levels.

A) Contamination of Groundwater (i.e. chemicals, fuel, wastes, sedimentation)

Groundwater contamination may occur during construction and operation.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Contamination of Groundwater (i.e. chemicals, fuel, waste, sedimentation)	Construction Operation Rehabilitation and Closure	-15.00	-9.75	-13.00

Proposed Preliminary Mitigation

Sound groundwater management measures need to be developed based on the results of the impact assessment.

B) Reduction of stream Baseflow

Mine dewatering may result in the reduction of stream baseflow.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Stream baseflow reduction due to dewatering	Operation	-11.25	-6.50	-7.58

Proposed Preliminary Mitigation

Sound groundwater management measures need to be developed based on the results of the impact assessment.



C) Reduction of groundwater reserves

Reduction of groundwater reserves due to mine dewatering. This will result in the lowering of the surrounding groundwater levels and aquifer yield.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Reduction of groundwater reserves	Construction Operation Rehabilitation and Closure	-9.75	-6.50	-6.50

Proposed Preliminary Mitigation

Sound groundwater management measures need to be developed based on the results of the impact assessment.

D) Acid Mine Drainage

Acid mine drainage, acid and metalliferous drainage (AMD), or acid rock drainage (ARD) is the outflow of acidic water from metal mines or coal mines. Acid rock drainage occurs naturally within some environments as part of the rock weathering process but is exacerbated by large-scale earth disturbances characteristic of mining and other large construction activities, usually within rocks containing an abundance of sulphide minerals. Areas where the earth has been disturbed (e.g. construction sites, subdivisions, and transportation corridors) may create acid rock drainage. In many localities, the liquid that drains from coal stocks, coal handling facilities, coal washing, and coal waste tips can be highly acidic.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
AMD	Rehabilitation and Closure	-12.25	-8.00	-9.33

Proposed Preliminary Mitigation

There are several options and treatments available for mitigating AMD and its effects. These will need to be assessed by the groundwater specialist in the EIA phase once detailed investigations and models have been completed.

9.3.4 PRELIMINARY IMPACTS ON HYDROLOGY

The following preliminary impacts on the hydrological resources within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on hydrology have been identified that will occur during the Planning and Design Phase and the Decommissioning Phase.

Below are the preliminary impacts on hydrological resources for the construction, operation, and rehabilitation and closure phases identified during scoping, as well as their impact rating.

A) Altered Hydrological Regime

Surface clearing may impact on the local hydrological regime. During operation the exclusion of dirty water areas and interception of run-off from these areas will decrease catchment yield. Post mining increased ingress to groundwater will result in decreased surface water available for wetland and surface water resources support.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Altered hydrological regime	Operation	-10.50	-8.25	-9.63

Proposed Preliminary Mitigation

Impact is associated with construction and should recover after construction phase when construction ceases.

B) Surface Water Contamination

Due to poor storm water management during construction and operational phases, contamination of surface water can occur. Discharge of the treated water from dewatering the old underground workings may also cause surface water contamination.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Surface contamination	water Construction Operation	-15.00	-13.00	-17.33

Proposed Preliminary Mitigation

Proper storm water management should be implemented.

C) Impact on Wetlands/ Drainage Lines

There are numerous wetland and drainage systems within the study area, the mining may impact on several wetlands and drainage lines.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact on Wetlands/ Drainage Lines	Construction	-15.00	-13.00	-17.33

Proposed Preliminary Mitigation

Where possible high sensitivity areas identified in surface water assessment should be avoided.

D) Increased sediment movement off the site

Particularly during the construction phase and also from any dumps and stockpile areas during the operational phase. Increased sediment deposition within the wetlands and water courses will lead to changes in benthic habitats and establishment of reed beds in areas of sediment deposition.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Sedimentation	Construction	-5.50	-2.75	-10.50
	Operation			

Proposed Preliminary Mitigation

Proper storm water management should be implemented; Proper management of stockpiles, erosion control.

9.3.5 PRELIMINARY IMPACTS ON SOILS AND GEOLOGY

The following preliminary impacts on the soils and geology within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on soils and geology have been identified for the Planning and Design Phase and Decommissioning Phase.

The major potential impact that would occur because of coal mining and related activities would be the loss of potentially productive agricultural land, along with a reduction in land capability. Where storage facilities are established, this impact is virtually permanent, while for other disturbed areas, spoil and topsoil can be replaced and rehabilitated to a certain degree, although a reduction (often significant) in agricultural potential usually occurs. Successful rehabilitation will depend on how well the mine personnel follow the prescribed guidelines in terms of correct stripping practice (depth and mapping units), optimum stockpiling (height and duration) and proper rehabilitation (physical manipulation and chemical preparation).

Below are the preliminary impacts on soils and geology features during the construction and rehabilitation and closure phases, as well as the impact rating.

A) Reduction in agricultural potential and loss of fertility

Reduction in natural soil fertility caused by removal, storage (stockpiling) and replacement of the soil profile. Aspects such as acidification, loss of nutrients and organic matter could apply. Such an impact will probably become greater, the longer such conditions apply.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss of fertility	Operation	-7.00	-6.50	-6.50

Proposed Preliminary Mitigation

Proper soil rehabilitation must be implemented.

B) Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)

During construction compaction of soil from heavy vehicles and machinery travelling off-road as well as operation on site may occur. Erosion from disturbances to soil structure and vegetation cover is also likely. Contamination of soil could also result from hydrocarbon or chemical spillages. An increased susceptibility of the soil to be affected by water erosion, caused by the removal of vegetation cover, leading to greater impact of rainfall on bare soil surface, especially on sloping terrain.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Loss/ disturbance of topsoil construction (including contamination, erosion and compaction).		-9.00	-8.25	-8.25

Proposed Preliminary Mitigation

Waste, hydrocarbons, and other chemicals should be handled and disposed of adequately to avoid contamination of soil. Erosion control measures should be implemented, and compaction of soil avoided where possible.

9.3.6 PRELIMINARY IMPACTS ON AIR QUALITY

Although there are several ambient air pollutants in the vicinity of the proposed Vlakvarkfontein Colliery, the pollutants of concern due to the mining activities will consist primarily of particulate matter. Greenhouse gases will also be released. The proposed operations at Vlakvarkfontein Colliery will comprise opencast mining operations, road transportation and materials handling. Atmospheric emissions represent the environmental aspects of concern for the baseline assessment of the mine. Air quality is noted as being of particular concern due to the location of the Arbor informal community in close proximity to the mine. Particulates present the main pollutant of concern from mining operations. Fugitive dust from materials handling operations, wind erosion, crushing and screening and vehicle entrainment on paved and unpaved roads are classified as routine emissions and are expected to be fairly constant throughout the year.

A) Gaseous and particulate emissions (including VOCs); fugitive dust

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Emissions and dust	Construction Operation	-10.50	-6.50	-9.75

Proposed Preliminary Mitigation

Proper dust management measures must be implemented. Erosion reduction measures to be implemented. Stockpile management measures will also be important to reduce these impacts.

9.3.7 PRELIMINARY VISUAL IMPACTS

Travelers through the project area will all be temporarily exposed to the proposed mining. Visual impacts would result from the construction, operation and decommissioning phase of the Vlakvarkfontein mine extension project. Specifically, impacts would result from the overburden dumps and the mining activities being seen from sensitive viewpoints. People working within the mine would be regarded as having a lower sensitivity as they would be focused on their work activities. Permanent views would be those from the farmsteads and residences within the area as well as from the nearby community. The topsoil, subsoil and hards will be hauled to a designated area and act as a berm between the community and the mine which will screen the mine from the community.

The project is also an extension of an existing open pit and there are also several coal mines in the area, most notably the Wes Coal mine immediately southwest of the Vlakvarkfontein site. The area is therefore already compromised visually and aesthetically. Based on this a visual impact assessment is not considered necessary for the EIA phase.



A) Visual Impacts

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Visual impact and impact on sense of place	Construction Operation	-8.75	-4.00	-4.00

Proposed Preliminary Mitigation

Construction areas must be kept clean and tidy. The construction of a berm between mine and community will also act as a screen and reduce the current visual impact of the mine on the community,

9.3.8 PRELIMINARY VIBRATION AND BLASTING IMPACTS

The potential impacts investigated due to blasting operations are ground vibration, air blast and fly rock, especially given the close proximity of the informal community to the mine site. The levels of these aspects are important as they may cause damage to structures, upset people and have influence on animals. There may also be a health and safety risk to the community.

The possible levels of significance will be determined and the prediction outcomes will determine the extent and if mitigation will be required. The possible environmental or social impacts with regards to blasting operations will be addressed in the EIA report.

A) Blasting and Vibration Impacts

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Blasting and vibration impacts	Operation	-11.25	-6.50	-8.67

Proposed Preliminary Mitigation

Mitigation will be based on what is considered safe blasting criteria with regards to structures and what is considered as an acceptable level with regards to human perception. This will be an outcome of the blasting assessment to be completed in the EIA phase.

9.3.9 PRELIMINARY SOCIO-ECONOMIC IMPACTS

The following preliminary impacts on the socio-economic environment within the study area were identified and assessed for the various project phases (planning and design, construction, operation, decommissioning, and rehabilitation and closure). No impacts on socio-economics have been identified that will occur during the Planning and Design Phase, Decommissioning Phase, and the Rehabilitation and Closure Phase.

Below are the construction and operational phase preliminary impacts on socio-economic environment identified during scoping, as well as their impact rating.

A) Reduction in Quantity of Water (i.e. Water Consumption)

The utilisation of groundwater for any purpose may result in the alteration/ reduction of groundwater levels on site thereby affecting local users.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Reduction in quantity of water (i.e. water consumption)	Construction	-7.50	-5.00	-5.00

Proposed preliminary Mitigation

Pre-construction water levels should be recorded for the water sources and should be monitored regularly to ascertain if the water levels are dropping drastically.

B) Interference with Existing Land Uses

Existing land uses might be affected during construction as land affected by the development footprint can no longer be used for other purposes.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Interference with Existing Land Uses	Construction	-9.00	-6.00	-6.00

Proposed Preliminary Mitigation

There must be a formal procedure in place on how to report incidents to ensure records of all grievances are kept, and responses are given within a certain time.

As far as possible interference with existing land uses/livelihoods should be avoided. If any interference takes place, the landowner should be compensated for their losses.

C) Nuisance and Impact on Sense of Place (i.e. noise, dust, etc.)

The proposed mine extension project will impact on the established sense of place of a particular property. Additional vehicles, increased noise and dust, the removal of vegetation, and potential influx of workers will all contribute to the alteration of the sense of place as well as creating a possible nuisance.

Impact	Project	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Nuisance and Impact on Sense of Place (i.e. noise, dust, etc.).	Construction Operation	-7.50	-5.00	-6.67

Proposed Preliminary Mitigation

Noise producing activities should be limited to non-working hours. Adequate dust suppression measures should be utilized to minimize dust production. There must be a formal procedure in place on how to report incidents to ensure records of all grievances are kept, and responses are given within a certain time.

Sense of place is defined as an individual's personal relationship with their local environment, both social and natural, which the individual experiences in their everyday daily life. It is therefore difficult to mitigate the impact



as it is experienced on a personal level. In general, the mitigation measures suggested by the specialist studies should be adhered to. Again, it must be noted that the area is already compromised visually and there are several mines and few scenic resources in the surrounding area.

D) Safety and Security (i.e. access to properties, theft, fire hazards, spontaneous combustion of coal stockpiles etc.)

Mining activities may result in a risk to the safety and security of landowners, lawful occupiers, and community members due to the increase in number of unfamiliar people in the area. In addition, the process of self-heating of coal or other carbonaceous material due to auto oxidation will result eventually in its ignition is termed as “spontaneous heating” and could cause fires.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Safety and security (i.e. access to properties, theft, fire hazards, etc.).	Construction	-11.00	-8.25	-8.25

Proposed Preliminary Mitigation

All contractors and employees should wear photo identification cards. Vehicles should be clearly marked as construction vehicles. Entry and exit points of the site should also be controlled. Coal stockpiles should be kept for limited time on site.

E) Damage/ Disruption of Services (i.e. water, electricity, sewage, etc.)

Construction operations have the potential to disrupt or damage services such as water supply or sewage collection pipes if not situated correctly within the study area.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Damage / disruption of services (i.e. water, electricity, sewage, etc.).	Construction	-9.00	-6.00	-6.00

Proposed Preliminary Mitigation

Before the project commences, an asset and services baseline of services that may be affected must be compiled. A copy of the baseline records should be given to each landowner/ service provider, and a master document kept by the applicant. If any damage occurs it should be reinstated to its pre-project status. Notice of any service interruptions must be given at least a day before the interruption takes place – an SMS or e-mail system can be used for this purpose.

F) Impact on Existing Infrastructure (i.e. roads, fences, etc.)

Activities may impact on existing infrastructure such as increased traffic on the adjacent road network, damage to fences and other local infrastructure.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Impact on existing infrastructure (i.e. roads, fences, etc.)	Construction	-9.00	-6.00	-6.00

Proposed preliminary Mitigation

Before the project commences, an asset and infrastructure baseline of any public and/or private infrastructure that may be affected must be compiled. A copy of the baseline records should be given to each landowner, and a master document kept by the applicant. If any damage occurs it should be reinstated to its pre-project status.

G) Perceptions and Expectations

The proposed project is likely to create great interest, particularly with regards to the potential for employment, perceived safety and security risks, and the exact nature of the proposed project.

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Perceptions and Expectations	Construction	-12.00	-8.25	-11.00

Proposed Preliminary Mitigation

Perceptions and expectations must be managed through ongoing, open and transparent communication with affected stakeholders, communities, landowners and occupiers.

H) Employment Opportunities

Employment opportunities for some unskilled, skilled labour as well as providing services during construction (e.g. accommodation, transportation, etc.) may arise from this project. It is important to note that the project is an extension of the existing open pit and therefore new job opportunities may be limited. Some of the activities are also specialised and thus the potential for employment is likely to be limited to a few. 1a23a4a5a

Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Employment Opportunities	Construction	+11.00	+12.00	+12.00

Proposed Preliminary Mitigation

Recruitment for any additional labour or services should be focused in the local area and preference given to the local communities.

I) Coal supply for energy security

The continued supply of coal to Eskom will aid in energy security for the country.



Impact	Project Phase	Pre-Mitigation Score	Post-Mitigation Score	Final Significance
Coal supply	Construction	+17.50	+17.50	+17.50

Proposed Preliminary Mitigation

No mitigation required.



10 PLAN OF STUDY FOR THE IMPACT ASSESSMENT

The section below outlines the proposed plan of study which will be conducted for the various environmental aspects during the EIA Phase. It is also important to note that the plan of study will also be guided by comment obtained from I&AP's and other stakeholders during the PPP.

10.1 DESCRIPTION OF ALTERNATIVES TO BE CONSIDERED

The alternatives considered and discussed in Section 6, including land use, location, and mining alternatives have culminated into the identification of feasible development alternatives. The feasible development alternatives are discussed below.

10.1.1 PROCESS ALTERNATIVES

The following is relevant to the process alternatives for consideration in the EIA phase:

Vlakovarkfontein is an open cast mine and that is the best suited mining method for this shallow coal resource. Underground mining or pillar extraction is geotechnically not possible due to shallow nature of the old underground coal mine. This alternative will therefore be excluded from the EIA report. Open Cast Mining (Alternative P1a) will therefore be assessed in the EIA phase.

- Regarding the filter cake, both the option to stockpile for use as non-select product (Alternative P2a) as well as the option for disposal (Alternative P2b) will be assessed in the EIA phase.
- For the disposal of carboniferous wastes (wash plant waste rock and possibly filter cake), the option of disposal of beneficiation plant waste rocks and filter cake to pit (Alternative P3d) appears to be most suitable at this stage because no new dump on surface will be required and this will assist with rehabilitation volumes. Disposal to a surface waste disposal facility located on old rehabilitated mine area (Alternative P3a) may also be assessed if disposal to the open pit is deemed to be an issue from an environmental perspective. In the event that designing the dumps on rehabilitated areas becomes problematic, the option of disposal to a surface waste disposal facility located on un-mined area (Alternative P3b) will also be considered.
- In terms of dewatering options, both Pump-treat-discharge (Alternative P4a) and Pump-store -treat-discharge (Alternative P4b) will be assessed in the EIA phase. Depending on feedback from further consultation with the DWS, one of these alternatives may be excluded from the EIA.
- For the wash plant water supply, this water will need to be obtained from dirty water containment facilities (Alternative P5a). The option of using water from ground or surface water resources for water supply (Alternative P5b) is excluded going forward based on the limited amount of groundwater in the area as well as the expected negative hydrological impacts.
- According to information received from the mine, dry processing (Alternative T1a) tests proved unsuccessful as a method of processing the coal. Wet washing (Alternative T1b) will therefore be carried through into the EIA phase.
- Regarding the various transport options considered, the practicality and flexibility of the road transport (Alternative T2a) make it the preferred option over both rail (Alternative T2b) and conveyor (Alternative T2c), neither of which are suited for transport of coal to Majuba Power Station. Both these options will therefore be excluded from the EIA phase.

10.1.2 ACTIVITY ALTERNATIVES

Both the mining option (Alternative A1) and the no-go option (Alternative A2) will be assessed in the EIA phase. The option to use the land for farming (Alternative A2) will not be assessed in the phase. This is because there



is very little topsoil on the site to facilitate crop growing. In addition, the negative impacts associated with livestock agriculture are considered to be significant enough to exclude this option going forward.

10.1.3 LOCATION ALTERNATIVES

Both location alternatives will be addressed in the EIA phase. This includes maximum mining over entire area (Alternative S1) and the sensitivity-based approach to avoid or buffer sensitive areas if high sensitivity areas are identified (Alternative S2). The most appropriate development alternative at this stage is likely to be the sensitivity-based approach although the maximum-mining approach may be viable if specialist studies confirm limited sensitivities on the ground during the EIA phase. This development alternative is also likely to have further implications in terms of mine design and the economic viability of the proposed project, all of which will be evaluated in the EIA investigation to be undertaken. Furthermore, it is important to note that the EIA to be undertaken will also involve the quantitative assessment of all development alternatives which were not excluded in this scoping report, indicating the impacts of each and then selecting the most appropriate development alternative going forward.

10.2 DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE EIA

The following aspects will be assessed further during the EIA phase investigation to be undertaken:

- Soils;
- Surface Water;
- Wetlands;
- Geohydrology;
- Cultural and Heritage Resources;
- Social Impacts;
- Air Quality;
- Waste Classification;
- Closure;
- Noise; and
- Blasting and Vibration.

The following aspect will be disregarded at scoping

- Visual impacts.

10.3 ASPECTS TO BE ASSESSED BY SPECIALISTS

Table 27 below details the various aspects of the project to be addressed in the EIA through detailed specialist studies. The table also includes a proposed scope of work/ terms of reference for each of the EIA specialist studies.



Table 28: Details of specialists appointed for the EIA Phase

Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
Surface Water	Surface Water Report	BEAL	Bruce Randall	<p>Surface Water methodology:</p> <ul style="list-style-type: none"> Activities on the proposed expansion project will be taken through an impact assessment prior to and post mitigation measures. Impacts will be assessed for the construction, operational, decommissioning and closure phases of the project. The catchments upstream of the wetlands will be identified. The average volume of surface water runoff that will be lost from these wetlands as a result of the mining operations will be calculated based on the average runoff from the relevant quaternary catchment. The runoff that is lost will be compared with the average runoff for each wetland and the impact on the wetlands will be calculated and expressed as a percentage of the average runoff of each wetland. <p>Storm water management methodology:</p> <ul style="list-style-type: none"> A conceptual storm water management plan will be drawn up for areas of the mine that do not have adequate storm water management infrastructure. Design criteria will be based on the requirements of GN704 of the National Water Act. New infrastructure required will be determined by determining the storm water management concept. Clean and dirty catchments will be identified and delineated based on current and future land use, available geochemistry data and available water quality data. Identify approximate infrastructure locations. A water balance model will be used to size and locate storm water management infrastructure based on an impact assessment on the receiving environment. Storm water outfall structures will be sized and designed (to concept level) to minimise erosion. <p>Flood lines:</p>



Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
				<ul style="list-style-type: none"> Flood line modelling will be conducted to determine the 1:50 and 1:100 year flood line for the river reach. All bridge and culvert opening sizes will be measured as part of the scope of work. Upstream river catchments will be delineated based on the Surveyor General's 5m contours. Representative historical daily rainfall will be sourced for the catchment. 50-year and 100-year flood peaks will be calculated on the river reach. <p>Salt balance analysis:</p> <ul style="list-style-type: none"> Collate available water quality data and obtain an understanding of the salt balance. Provide a salt balance (TDS loads only) for the existing water balance based on representative water quality data provided by the mine, or on typical water qualities for collieries in the region. The salt balances will be documented as a single-page diagrams of the wet season, dry season, average daily loads throughout the year and annual average TDS salt loads. Includes the short films and
Hydrogeological study including geochemical assessment, groundwater models and waste classification	Ground Water Report Waste Classification	Groundwater Square	Louis Botha	<p>The following methodology is proposed:</p> <p>Collection of field data:</p> <ul style="list-style-type: none"> Perform geophysical surveys to provide additional information on geological layering. Perform EC profiling on borehole water columns. Perform water sampling of boreholes, springs, surface water and potentially also of private boreholes if required. Perform aquifer and borehole hydraulic testing. Laboratory analysis of sampled water: <p>Data evaluation in the context of geological information provided by the mine:</p>



Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
				<ul style="list-style-type: none"> • Computerise/analyse/interpret field test data;. • Interpret/describe aquifer conditions and hydraulic attributes. <p>Geochemical assessment for opencast operation:</p> <ul style="list-style-type: none"> • Analyse client database of mineralogical and elemental composition of the rock/coal material. • Determine the potential for acidic mine drainage over the long term. • Perform oxygen diffusion and geochemical trend numerical modelling to determine the expected variations in mine water quality. <p>Groundwater modelling:</p> <ul style="list-style-type: none"> • Compile conceptual model. • Compile and calibrate detailed numerical 3D model(s) to quantify/assess impacts;. • Incorporate geochemical assessment data in numerical models, to enable prediction of contaminant movement. <p>Groundwater impacts:</p> <ul style="list-style-type: none"> • Identify/describe/calculate impacts on the groundwater environment through analytical equations and numerical modelling. • Propose mitigation/management measures. • Identify data gaps and focus areas for additional research if required
Wetland, Aquatic Ecology and Pedological Study	Soils, aquatic ecology and wetlands	The Biodiversity Company	Andrew Husted	<p>The following methodology is proposed:</p> <ul style="list-style-type: none"> • The wetland areas will be delineated in accordance with the DWAF (2005) guidelines. • A Level 2 assessment will be undertaken based on a desktop synthesis of available data followed by a rapid field assessment. • The ecological classification (Eco-Classification) of the systems will require the determination and categorisation of the Present Ecological State (PES; health or



Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
				<p>integrity) of individual biophysical attributes, and then comparing these findings to the natural or close to natural reference condition.</p> <p>Soils:</p> <ul style="list-style-type: none"> The site will be traversed by vehicle and on foot. A soil auger will be used to determine the soil form/family and depth. The soil is hand augured to the first restricting layer or 1.5 m. Soils will be identified to the soil family level as per the "Soil Classification: A Taxonomic System for South Africa". Landscape features such as existing open trenches were also helpful in determining soil types and depth. Land capability and agricultural potential is to be determined.
Heritage and paleontology	Heritage Assessment Paleontological Assessment	PGS Heritage	Wouter Fourie	<p>A heritage impact assessment was completed for the project site in 2011. This will be utilized for the EIA phase. This report, including all the relevant documentation (maps, tables and figures) was compiled by PGS for the mining right area. The study process involved three methodological steps:</p> <ul style="list-style-type: none"> Literature review. Physical survey. Data collation and report writing. <p>A new paleontological impact assessment will be conducted. This will include a site visit. The fieldwork component consists a general field survey of the larger footprint areas for the project as provided and is aimed at identifying fossil resources potentially falling within the area.</p>
Noise	Noise impact assessment	EAR	Morne Jager	<p>Work that will take place during the Environmental Noise Impact Assessment phase is defined in section 8 of SANS 10328:2008.</p> <p>Baseline process:</p> <ul style="list-style-type: none"> The identification of potential noise-sensitive receptors using available information (GoogleEarth, EIA's in Public Domain). Collation of available information for the study area.



Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
				<ul style="list-style-type: none"> Site visit to verify the status of identified potential noise-sensitive receptors (if option is selected). Measurements of ambient sound levels in terms of LAeq (10 min) as well as LA90 (fast and impulse setting), at selected locations during the appropriate time periods. The measurements as obtained during fieldwork will be displayed in an appropriate manner and used to develop acceptable rating levels for the area. Basic Noise Propagation Modelling for both the Construction and Operational phases, with the resulting total future predicted sound levels projected on a topographical map or aerial image, considering a worst-case scenario. The calculated noise levels LAeq will be compared against the measured Ambient Sound level as well as the appropriate SANS rating level to determine the potential impact on the surrounding environment, focusing on potential sensitive receptors. <p>Environmental Noise Impact Assessment report:</p> <ul style="list-style-type: none"> Noise Propagation Modelling for both the construction and operational phases, with the resulting total future predicted sound levels projected on a topographical map or aerial image, considering a worst-case scenario (including cumulative impact from all potential industries operational). The calculated noise levels LAeq will be compared against the measured Ambient Sound level as well as the appropriate SANS rating level to determine the potential impact on the surrounding environment, focusing on potential sensitive receptors. Completion of impact assessment tables for the various noise-generating activities. 4. Environmental management plan and mitigation measures. The compilation of an ENIA Report as per SANS 10328:2008.
Blast and vibration	Blasting and vibration impact report	Blast Management & Consulting	ZD Zeeman	<p>The following methodology is proposed:</p> <ul style="list-style-type: none"> A site visit be undertaken in order to obtain all relevant information onsite and offsite of the mining area. Review of site considering the various installations in and around the proposed blasting area.



Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
				<ul style="list-style-type: none"> Definition of existing structures and review of possible concerns. Conduct a baseline study of ground vibration, air blast and fly rock from existing operations to be applied in EIA evaluation. Modelling and Report: a detailed study will be prepared using data captured and pending the applicability of the following specific aspects. Applicable aspects will be presented as different sections in a final report.
Air quality	Air quality impact assessment	Airshed	Hanlie Liebenberg-Enslin	<p>The following methodology is proposed:</p> <ul style="list-style-type: none"> The compilation of an emissions inventory incl. the identification and quantification of all emissions associated with the proposed mining operations, including the infrastructure relocation. Pollutants quantified will include particulate matter (TSP, PM10 and PM2.5), gaseous pollutants i.e. carbon monoxide (CO), oxides of nitrogen (NOx) and sulphur dioxide (SO2) as well as selected metals. Use will be made of design emission standards, emissions factors published by the United States Environmental Protection Agency (US EPA) and Australian National Pollutant Inventory (NPI). Atmospheric dispersion simulations of all gaseous pollutants and PM10, PM2.5 and dust fallout for the operations reflecting highest hourly, highest daily and annual average concentrations due to routine and upset emissions from the mining operations. The US EPA approved AERMOD model will be used. Impact assessment by comparing ambient pollutant concentration levels to the relevant air quality requirements. The identification of air quality management and mitigation measures based on the findings of the compliance and impact assessment. The development of an air quality monitoring programme to be included in the EMPR. Greenhouse gas quantification.
Social	Social assessment	Equispectives	Ilse Aucamp	The following methodology is proposed:



Aspect	Component	Company Responsible	Consultant	Scope of Work for EIA
				<ul style="list-style-type: none"> • Baseline description of the study area that will include a review of available literature. This will include relevant legislation and existing provincial and municipal documents and studies, as well as any additional literature that is deemed to be applicable to the study. • Necessary demographic data will be obtained from Statistics South Africa and Municipal Integrated Development Plans. • An initial site visit will be conducted for scoping purposes. • Fieldwork will be used to obtain additional information and communicate with key stakeholders. Stakeholders typically include social structures such as ward councillors, municipal representatives, landowners, community representatives, forums and political leaders, amongst others. During this phase the number of affected households that occupy the area illegally will be identified. • Information will be obtained via focus groups, formal and informal interviews, observation, immersions, in-the-moment discussion groups, the Internet and literature reviews. Notes will be kept of all interviews and focus groups. • An interview schedule might be used instead of formal questionnaires. An interview schedule consists of a list of topics to be covered, but it is not as structured as an interview. It provides respondents with more freedom to elaborate on their views. • The final report will focus on current conditions, providing baseline data. Each category will discuss the current state of affairs, but also investigate the possible impacts that might occur in future. Recommendations for mitigation will be made at the end of the report. • The study will have a participatory focus. This implies that the study will focus strongly on including the local community and key stakeholders. Participatory methods will be used to identify local economic development projects. • Impacts will be rated according to the prescribed impact tables. <p>Information obtained through the stakeholder engagement process will inform the writing of the report and associated documents.</p>



10.4 PROPOSED METHOD OF ASSESSING ENVIRONMENTAL ASPECTS

The same method of assessing impact significance as was used during the Scoping phase will be applied during the EIA phase. This methodology is described in detail in Section 9.1.

10.5 PROPOSED METHOD FOR ASSESSING DURATION SIGNIFICANCE

The significance of environmental impacts will be rated before and after the implementation of mitigation measures. These mitigation measures may be existing measures or additional measures that may arise from the impact assessment and specialist input. The impact rating system considers the confidence level that can be placed on the successful implementation of the mitigation. The proposed method for the assessment of environmental issues is set out in the Section 9.1. This assessment methodology enables the assessment of environmental issues including: the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

The specialist studies will recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts, enhance beneficial impacts, and assist project design. If appropriate, the studies will differentiate between essential mitigation measures, which must be implemented and optional mitigation measures, which are recommended ("nice-to-haves").

10.6 STAGES AT WHICH COMPETENT AUTHORITIES WILL BE CONSULTED

Competent authorities will be consulted during the initial notification period, the scoping phase, and during the EIA phase. A pre-application meeting was held with the DMR on 5 September 2017. A pre-application meeting was also held with DWS on 21 September 2017. No additional Authority meetings are scheduled during the scoping phase. However, if and/or when an authority requires a meeting one will be arranged. The date, time, and venue of the meeting will be scheduled post dissemination of the project notification documents should one be required. The purpose of the Authority meeting would be to explain the project in detail to authorities and clarify the process going forward.

10.7 PROPOSED METHOD OF PUBLIC PARTICIPATION

An overview of the proposed public participation process to be followed for the EIA phase is provided below.

The commenting periods that will be provided to the I&AP's (and the competent authorities) will be thirty (30) days long. Two commenting periods will be provided for the:

- Scoping Report (19 October 2017 – 20 November 2017); and
- EIA/EMPR (dates to be confirmed).

All comments received during the initial call to register and Scoping Report comment periods will be included in the Final Scoping Report for submission to the authorities. The dates of the review and commenting period for the draft EIA/EMPR will be determined later and communicated to all registered I&AP's.

10.7.1 STEPS TO BE TAKEN TO NOTIFY INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) were notified of the proposed application via registered letters, emails and facsimiles. The Public Participation Process will be undertaken in accordance with the NEMA process and the 2014 Regulations. A minimum of 30 days was provided to the public to register as I&AP's and to provide comments and a further 30 days to comment on the draft Scoping Report. The information submitted by I&AP's will be utilised during the Impact Assessment and compilation of the EIAR. Upon acceptance of the Scoping Report an EIA process will be undertaken. An EIAR will be drafted, this report will be put out for public review with a further 30-day commenting period given to I&AP's.

Feedback from I&AP's has been and will be solicited through the following means:

- Advertisements;



- Site Notices and Posters;
- Registered Letters;
- Faxes and e-mails; and
- Any other communication with EIMS.

10.7.2 DETAILS OF ENGAGEMENT PROCESS TO BE FOLLOWED

I&APs will be afforded the following opportunities to participate in the project.

- I&APs have been requested via written notifications distributed to provide their comments on the project.
- The EIA/EMP Report will be available for comment for a period of 31 days at the same public places in the project area that the Draft Scoping Report was made available, sent to stakeholders who request a copy, and placed on the EIMS website: www.eims.co.za.
- A public meeting will be held during the review period for the scoping and EIA reports. Focus group meetings will also be held with key stakeholders.

All comments and issues raised during the public comment period will be incorporated into the EIA/EMP Report to be submitted to the competent and commenting authorities.

10.7.3 DESCRIPTION OF INFORMATION TO BE PROVIDED

The following information will be provided during the PPP:

- The site plan;
- List of activities to be authorised;
- Scale and extent of activities to be authorised;
- Typical impacts of activities to be authorised (e.g. surface disturbance, dust, noise, drainage, fly rock etc.);
- The duration of the activity;
- Sufficient detail of the intended operation to enable communities to assess what impact the activities will have on them or on the use of their land);
- The purpose of the proposed project;
- The Mining methods to be used;
- Details of the affected properties (including parent farm and portion);
- Details of the MPRDA and NEMA Regulations that must be adhered to;
- The minerals being mined;
- Date by which comment, concerns and objections must be forwarded through to both EIMS the DMR respectively; and
- Contact details of the Environmental Assessment Practitioner (EAP).



10.8 DESCRIPTION OF TASKS THAT WILL BE UNDERTAKEN DURING THE EIA PROCESS

The plan of study in terms of certain aspects is detailed in the above sections, and is summarised below. The following tasks will be undertaken as part of the EIA phase of the project:

- Detailed specialist studies
- Public consultation:
 - Notification of the availability of the EIAR for review and comment to all registered I&AP's;
 - Informing registered I&APs of the project progress.
 - Public and focus group meetings if required.
- Authority consultation:
 - Consultation with DMR and the commenting authorities; and
 - Authorities consultation (including meetings where necessary) to provide authorities with project related information and obtain their feedback.
- Document compilation:
 - The EIA and EMPR will be compiled in line with the requirements of Appendix 3 and 4 of the NEMA Regulations.
 - The EIA and EMPR will be made available for public comment for a minimum period of 30 days.
 - The EIA and EMPR will be finalised and submitted to the DMR.

10.9 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IMPACTS

All comments received by I&APs will be taken into consideration and inform the high-level mitigation measures. Detailed mitigation measures will be further developed as part of the EIA phase. The potential impacts will further be assessed in terms of the mitigation potential, taking into consideration the following:

- Reversibility of impact:
 - Reversible.
 - Partially reversible.
 - Irreversible.
- Irreplaceable loss of resources:
 - Replaceable.
 - Partially replaceable.
 - Irreplaceable.
- Potential of impacts to be mitigated:
 - High.
 - Medium.
 - Low.



This information for each identified impact will be provided in the EIA and EMPR.



11 SENSITIVITY MAPPING

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets, opportunities, and constraints in a defined spatial context. The sensitivity mapping technique integrates numerous datasets (basemaps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is determined by specialists input within each respective field based on aerial or ground-surveys. Environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of Environmental Assessment processes. Table 28 below provides a breakdown of the sensitivity rating and weightings applied to determine the sensitivity score of each aspect. Figure 24 provides a graphical illustrations of the sensitivity mapping exercise applied to determine the overall environmental sensitivity within the study area.

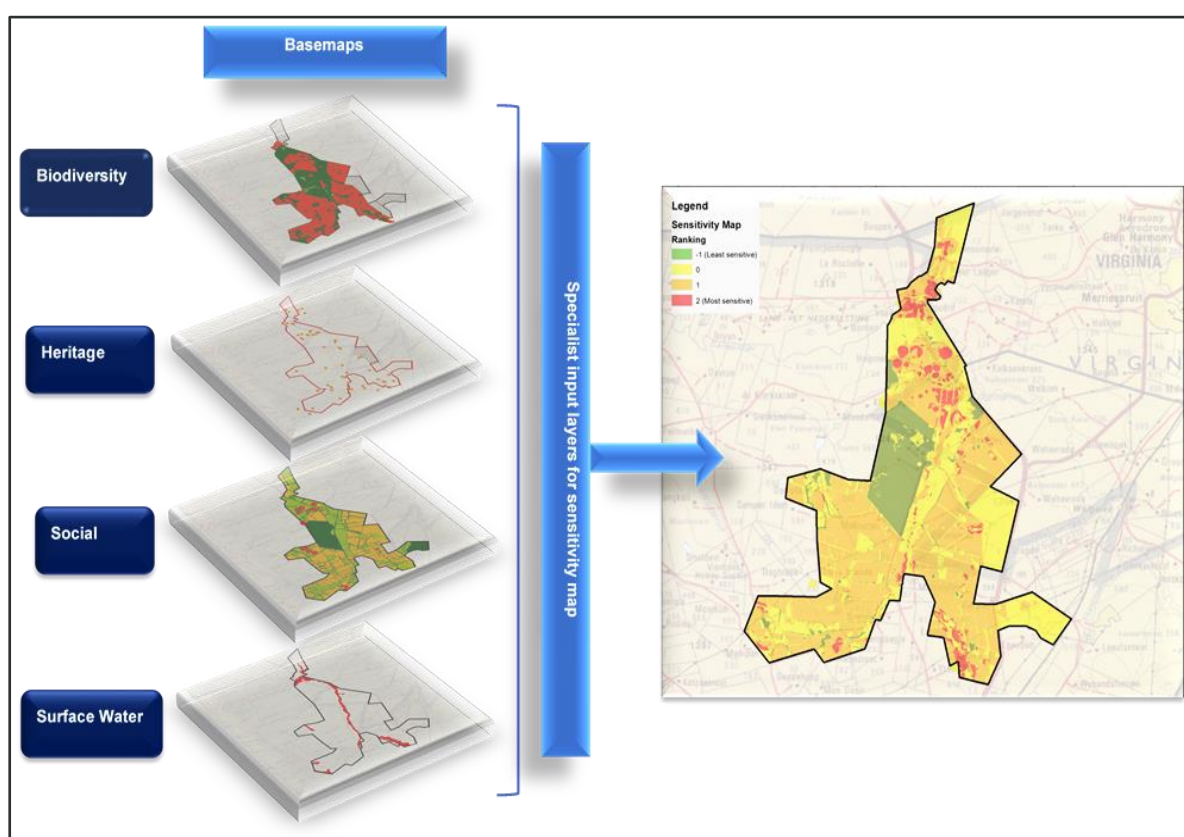


Figure 24: Sensitivity mapping approach



Table 29: Sensitivity rating and weighting

Sensitivity Rating	Description	Weighting
Least concern	The inherent feature status and sensitivity is already degraded. The proposed development will not affect the current status and/or may result in a positive impact. These features would be the preferred alternative for mining or infrastructure placement.	-1
Low/Poor	The proposed development will not have a significant effect on the inherent feature status and sensitivity.	0
High	The proposed development will negatively influence the current status of the feature.	1
Very high	The proposed development will have a significantly negative influence on the current status of the feature.	2

The preliminary sensitivity map (Figure 24) indicates that no areas of high or very high sensitivity have been identified at the scoping phase for the expansion area, although some areas closer to the community have been identified as being potentially more sensitive than the remainder of the site based on the proximity of the community to the site. The sensitivity map will be updated in the EIA phase once detailed specialist investigations have been completed. It is still possible that areas of higher sensitivity will be identified through the EIA once the various specialists have completed their fieldwork.



12 ASSUMPTIONS, LIMITATIONS, AND UNCERTAINTIES

Certain assumptions, limitations, and uncertainties are associated with the Scoping Phase. This report is based on information that is currently available and, as a result, the following limitations and assumptions are applicable:

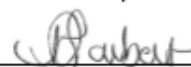
- The report is based on project information provided by the client.
- The report is based on a project description taken from drawings and design specifications for the proposed mine extension that have not yet been finalised, and which are likely to undergo a number of iterations and refinements before they can be regarded as definitive. A project description based on the final design will be provided in the EIR Phase.
- No specialist studies have been completed for the scoping phase. Descriptions of the natural and social environments are based on limited desktop assessments and available literature. More detailed information will be provided in the EIR phase based on the outcomes of the specialist studies. Limited scoping-phase specialist input was obtained for inclusion in the sensitivity map and the alternative assessment section (section 6) only.
- The description of the baseline environment has been obtained from various sources including the existing IWWMP, EMPR and recent monitoring reports and specialist studies for the current mine. Every effort was made to find the most recent applicable data. Where possible up-to-date information was obtained from development plans or online portals (SANBI, SAHRA etc) or from the most recent dust and water monitoring reports from the mine.
- The levels of confidence for the impact assessment section (Chapter 9) are considered low until detailed specialist input is obtained in the EIA phase.
- In determining the significance of impacts, with mitigation, it is assumed that mitigation measures proposed in the report are correctly and effectively implemented and managed throughout the life of the project.
- The health and safety of communities has been assessed in the EIA as this relates to potential social impacts that may arise from the project. The EIA did not however assess the health and safety of workers as this is regulated separately under the Mine Health and Safety Act and the Occupational Health and Safety Act.



13 UNDERTAKINGS

13.1 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

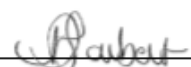
I Adri Joubert herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report.


Signature of the EAP

Date: 16 October 2017

13.2 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I Adri Joubert herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.


Signature of the EAP

Date: 16 October 2017



14 REFERENCES

- Department of Water Affairs (DWA), Integrated Water Use Licence (IWUL) for Ntshovelo Mining Resources (Pty) Ltd. Licence No: 4/B20F/AGJ/1131 File No: 16/2/7/B100/C249
- Digby Welles Environmental: Closure Cost Assessment for Vlakvarkfontein Coal Mine 2016
- Geo Soil & Water, Vlakvarkfontein Colliery: Rehabilitation Strategy and Implementation Programme, May 2016
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- Geovicon Environmental: Environmental Impact Assessment, Ntshovelo Mining Resources, Vlakvarkfontein Colliery, January 2009
- Groundwater Square: Vlakvarkfontein Colliery Pillar Mining Project: Groundwater Feasibility Assessment, June 2017
- Emalahleni Spatial Development Framework, 29 May 2015
- Emalahleni Integrated Development Plan for 2016 – 2017 financial year
- Nkangala District Municipality Integrated Development Plan 2017
- Letsolo Water and Environmental Services: Environmental Management Programme Performance Assessment in line with Approved EMP Ref: Mp 30/5/1/2/3/2/1(300) EM, July 2017
- Mpumalanga Biodiversity Conservation Plan
- PGS Heritage: Vlakvarkfontein Phase 1 Heritage Impact Assessment, 2014.
- PGS Heritage: Grave Relocation Report for Vlakvarkfontein Mine, 2011.
- Victor-Khanye Municipality IDP 2017 - 2018