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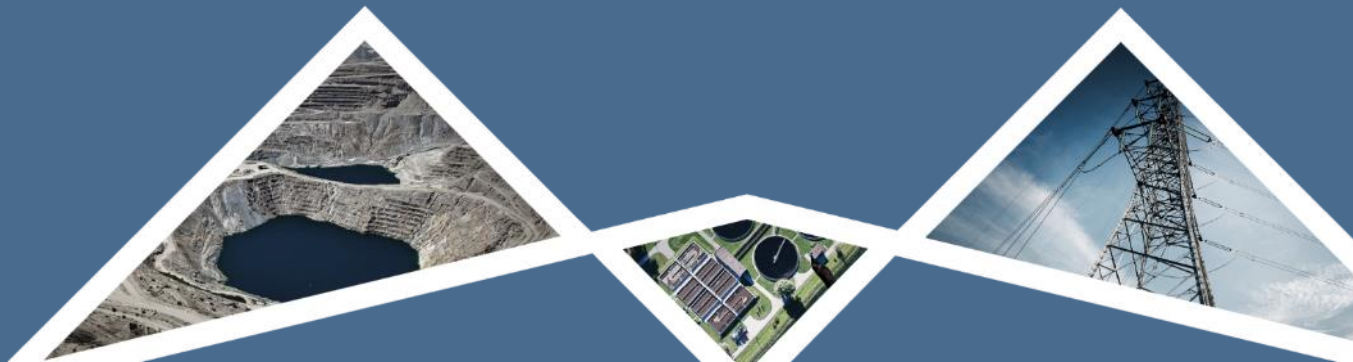
ENVIRONMENTAL SCOPING REPORT

KALABASFONTEIN MINING RIGHT APPLICATION



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REVISION AND AMENDMENTS

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2018/07/06	ORIGINAL DOCUMENT	Revision 0 – Public Review
2018/08/13	FINAL DOCUMENT	Scoping Report for DMR adjudication

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ABBREVIATIONS

AMD	:	Acid Mine Drainage
CM	:	Continuous Miner
CMA	:	Catchment Management Agency
CMS	:	Catchment Management Strategy
DEA	:	Department of Environmental Affairs
DMR	:	Department of Mineral Resources
DMS	:	Dense Media Separation Plant
DWA	:	Department of Water Affairs
DWS	:	Department of Water 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
GDP	:	Gross Domestic Product
GHG	:	Greenhouse Gas
GN	:	Government Notice
HIA	:	Heritage Impact Assessment
HMS	:	Heavy Medium Settlers
I&AP	:	Interested & Affected Party
IBA	:	Important Bird Area
IEM	:	Integrated Environmental Management
IMC	:	Inter-Ministerial Committee
LOM	:	Life of Mine
MA	:	Mineral 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
NEMWA	:	National Environmental Management: Waste Act, 2008
NEMA	:	National Environmental Management Act, 1998
NGDB	:	National Groundwater Database

NHRA	:	National Heritage Resources Act, 1999
NWA	:	National Water Act, 1998
PHRA	:	Provincial Heritage Resources Authority
PCD	:	Pollution Control Dam
PoF	:	Probability of Failure
PES	:	Present Ecological State
$\bar{Q}\bar{A}$	:	Quarterly Average
RBCT	:	Richards Bay Coal Terminal
RE	:	Remaining Extent
RoM	:	Run of Mine
SAHRA	:	South African Heritage Resources Agency
WMA	:	Water Management Area
WUL	:	Water Use Licence

EXECUTIVE SUMMARY

Forzando Coal Mines (Pty) Ltd. applied to the Department of Mineral Resources (DMR) for the conversion of Old Order Mining Rights to New Order Mining Rights for its mining operations at the Forzando North Shaft and Forzando South Shaft. These conversions were granted in November 2011 and executed on 28 June 2013.

This application is for the extension of the current mining areas (under Section 102 of MPRDA (Act No. 28 of 2002)) by inclusion of contiguous areas which are held under Prospecting Rights 1035PR & 1170PR. Through an intensive drilling exercise on these areas, economically viable blocks of coal have been defined. The plan is to access these newly defined blocks of coal from the existing Forzando South incline. Underground mining has been selected as the appropriate mining method for the Kalabasfontein project.

Annexation of these Prospecting Rights into the existing Forzando South Mining Right is motivated by subsequent reduction of Reserves at Forzando North Shaft. This diminution is as a result of unexpected poor ground conditions as well as burnt coal (Forzando Coal Mines (Pty) Ltd. 2018).

Kalabasfontein project area is situated in Mpumalanga, 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel). It is located to the east and south of the existing Forzando South 380MR and Forzando North 381MR respectively which fall within the Msukaligwa Local Municipality. The project area comprises two prospecting rights, 1035PR & 1170PR, which covers a total area of ~1 547.8296ha over portions 7, 8, Remaining Extent (RE), 11 and 13 of the farm Kalabasfontein 232 IS. As part of the Kalabasfontein project, two alternative sites have been proposed for a new ventilation shaft, namely Portion 7 of the farm Uitgedacht 229 IS and Portion 22 of the farm Uitgedacht 229 IS. Initial granting of both Prospecting Rights was in 2006 to Forzando Coal Mines (Pty) Ltd. Subsequent to this, in respect of 1035PR and before the right could lapse on the 2nd of November 2009, a Prospecting Rights renewal was applied for in October 2009. In respect of PR 1170 the renewal was applied for on 12 January 2011 before the right could expire on 9 April 2011. Both renewals were granted on the 31st July 2015 with execution finalised on the 27th October 2015, extending the validity of both Prospecting Rights to the 30th of July 2018. The proposed extension of the current mining area will require minimal new surface infrastructure as the mining method to be employed is underground mining and existing surface infrastructure from the Forzando South mine will be used.

Forzando Coal Mines (Pty) Ltd has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) to act as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment for the proposed Kalabasfontein project. 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). 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 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 provide preliminary identification and confirmation of 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. This site selection process will be refined and finalised in the subsequent EIA phase;

- 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. This will assist in determining 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 preliminary measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored. These mitigation measures will be further refined during the EIA phase.

PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) for the proposed project will be 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 20 June 2018 with an initial notification and call to register for a period of 30 days, ending on the 20 July 2018. This scoping report has been made available for public review and comment for a period of 30 days, from 10 July to 10 August 2018, in line with the legislative timeframes. The comments received from I&AP's during these commenting periods have been summarised this report and appended in detail in the Public Participation Report. Comments received during the review period have been addressed in the PPR and will be taken into account for the next project phase.On acceptance of the scoping report from DMR, an EIA Report, including an 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.

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 the potential impacts have been identified. Each of the identified risks and impacts for these phases was assessed using the 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 following impacts were determined to have a potentially moderate-high negative final significance:

- Impacts on heritage and palaeontological resources;
- Impacts on ecology;
- Impacts on geohydrology;
- Impacts on hydrology;
- Impacts on soils and geology;
- Socio-economic impacts.

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

- Coal supply for international markets; and
- Continued economic growth.

The positive and negative impacts will be further assessed during the EIA phase of the project. Potential mitigation measures have been identified and will be refined and supplemented 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 impacts.

1 INTRODUCTION

Forzando Coal Mines (Pty) Ltd. applied to the (DMR) for the conversion of Old Order Mining Rights to New Order Mining Rights for its mining operations at the Forzando North Shaft and Forzando South Shaft. These conversions were granted in November 2011 and executed on 28 June 2013.

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Kalabasfontein project area is situated in Mpumalanga, 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel). It is located to the east and south of the existing Forzando South 380MR and Forzando North 381MR respectively which fall within the Msukaligwa Local Municipality. The project area comprises two prospecting rights, 1035PR & 1170PR, which covers a total of ~1 547.8296ha over portions 7, 8, RE, 11 and 13 of the farm Kalabasfontein 232 IS. A new ventilation shaft will be located either on Portion 7 of the farm Uitgedacht 229 IS or on Portion 22 of the farm Uitgedacht 229 IS as part of the Kalabasfontein project. Initial granting of both Prospecting Rights was in 2006 to Forzando Coal Mines (Pty) Ltd. Subsequent to this, in respect of 1035PR before the right could lapse on the 2nd of November 2009, a Prospecting Rights renewal was applied for in October 2009. In respect of PR 1170 the renewal was applied for on 12 January 2011 before the right expired on 9 April 2011. Both renewals were granted on the 31st July 2015 with execution finalised on the 27th October 2015, extending the validity of both Prospecting Rights to the 30th of July 2018. The proposed extension of the current mining area will require minimal new surface infrastructure as the mining method to be employed is underground mining and existing surface infrastructure from the Forzando South mine will be used.

Forzando Coal Mines (Pty) Ltd. has appointed EIMS to act as the independent EAP to undertake the EIA for the proposed Kalabasfontein project. An application for the amendment to the existing 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). A new water use licence application (WULA) for the relevant water use triggers associated with the proposed project will also be undertaken.

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 1 below.

Table 1: Report Structure.

Environmental Regulation	Description	Section in Report
	NEMA Regulation 982 (2014)	
Appendix 2(2)(a):	Details of – The EAP who prepared the report; and The expertise of the EAP, including a curriculum vitae;	Section 1.2 Section 1.3
Appendix 2(2)(b):	The location of the activity. Including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 2
Appendix 2(2)(c):	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On a land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 2.1
Appendix 2(2)(d):	A description of the scope of the proposed activity, including – All listed and specified activities triggered; A description of the activities to be undertaken, including associated structures and infrastructure;	Section 3 Section 4
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	Section 4

Environmental Regulation	Description	Section in Report
	frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	
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;	Section 5
Appendix 2(2)(h):	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including – Details of all alternatives considered; Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; 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; The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; 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 – Can be reversed; May cause irreplaceable loss or resources; and Can be avoided, managed or mitigated; 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; 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; The possible mitigation measures that could be applied and level of residual risk; The outcome of the site selection matrix;	Section 6 Section 7 Section 8 Section 9

Environmental Regulation	Description	Section in Report
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and A concluding statement indicating the preferred alternatives, including preferred location of the activity;	
Appendix 2(2)(i):	A plan of study for undertaking the environmental impact assessment process to be undertaken, including – A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; A description of the aspects to be assessed as part of the environmental impact assessment process; Aspects to be assessed by specialists; 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; A description of the proposed method of assessing duration and significance; An indication of the stages at which the competent authority will be consulted; Particulars of the public participation process that will be conducted during the environmental impact assessment process; and A description of the tasks that will be undertaken as part of the environmental impact assessment process; 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.	Section 11
Appendix 2(2)(j)	An undertaking under oath or affirmation by the EAP in relation to – The correctness of the information provided in the report; The inclusion of comments and inputs from stakeholders and interested and affected parties; and 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;	Section 14
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 environmental impact assessment;	Section 14

Environmental Regulation	Description	Section in Report
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

For the purposes of this Scoping Report the following person can be contacted at EIMS:

EAP Name: Sonja van de Giessen

SACNASP Registration Number: 400058/18

Contact no: +27 11 789 7170

Email address: sonja@eims.co.za

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. 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:

1) Objective and independent;
2) Has expertise in conducting EIA's;
3) Comply with the NEMA, the Regulations and all other applicable legislation;
4) Takes into account all relevant factors relating to the application; and
5) 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 environmental impact assessments 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 (see Section 17.1).

1.3.2 SUMMARY OF THE EAP'S PAST EXPERIENCE

Sonja van de Giessen is a senior consultant with more than six years of experience in environmental impact assessments and environmental management. Her core experience and expertise is in the mining industry sector, focusing on Environmental Impact Assessments, Environmental Management Programmes, Water Use Licence Applications and Integrated Water and Waste Management Plans, and Environmental Auditing. Her involvement in such projects varies from project management, to the compilation of technical and environmental documentations and reports. Sonja is registered as a Professional Natural Scientist in the Environmental Science field of practice with SACNASP. The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with environmental impact assessment and relevant application processes) of the consultants that were involved in the EA / Scoping process and the compilation of this report are attached as Appendix A.

1.3.3 SPECIALIST CONSULTANTS

Specialist consultants will be appointed to provide discipline specific input during the EIA phase and the following specialist disciplines are proposed at this stage:

- Air Quality;
- Wetland Study;
- Blasting and Vibrations Studies;
- Heritage and Palaeontology;

- Hydrogeology;
- Hydrology;
- Noise Study;
- Visual Impact Assessment;
- Ecology;
- Social Impact Study;
- Soils, Land Use and Capability;
- Agricultural Impact Study;
- Climate change Impact Study; and
- Closure Plan and Quantum Update.

In line with NEMA GNR 982 Appendix 6, the details of the relevant specialists, a summary of their expertise as well as their declarations of independence will be included in their respective reports that will be appended to the EIA Report.

2 DESCRIPTION OF THE PROPERTY

Kalabasfontein project area is situated in Mpumalanga, 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel). It is located to the east and south of the existing Forzando South 380MR and Forzando North 381MR respectively which fall within the Msukaligwa Local Municipality, see attached locality plan (Figure 1). The project area comprises two prospecting rights, 1035PR & 1170PR, which covers a total area of ~1 547.8296ha over portions 7, 8, RE, 11 and 13 of the farm Kalabasfontein 232 IS. An additional ventilation shaft will also be required within the Forzando South mining area on either on Portion 7 or Portion 22 of the farm Uitgedacht 229 IS (refer to Figure 1 and Figure 2 below)

Table 2: Property description

<table>
<tr><td>Summary</td><td colspan="6"><u>Mining Right holder</u>
Forzando Coal Mines (Pty) Ltd is the holder of Mining Rights in respect of the following operations:
Forzando South (380MR)
Forzando North (381MR)
The details of the properties where the current Forzando South and Forzando North Coal Mine operations are situated are provided below. The current approved EA and WUL only covers the properties listed on the left side of the table, the proposed future mining operations fall outside of these properties (but within the prospecting right area) and thus require environmental and water use authorisation.</td></tr>
<tr><td>Application Area (Ha)</td><td colspan="6">The properties affected by this application cover an area of ~1 547.8296 (ha).</td></tr>
<tr><td>Magisterial District</td><td colspan="6">The Kalabasfontein project area is situated in the Msukaligwa Local Municipality within the Gert Sibande District Municipality, Mpumalanga Province.</td></tr>
<tr><td>Distance and direction from nearest town</td><td colspan="6">Kalabasfontein project area is situated 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel)</td></tr>
<tr><td rowspan="10">21-digit Surveyor General Code for each Portion</td><td colspan="3">Properties <u>within Mining Right area-</u> Forzando South (380MR)</td><td colspan="3">Properties <u>affected by this Application</u></td></tr>
<tr><td>Farm Name:</td><td>Portion:</td><td>SG Codes:</td><td>Farm Name:</td><td>Portion:</td><td>SG Codes:</td></tr>
<tr><td rowspan="2">Kalabasfontein 232 IS</td><td>Portion 8</td><td>T0IS00000000023200008</td><td rowspan="5">Kalabasfontein 232 IS</td><td rowspan="2">7</td><td rowspan="2">T0IS00000000023200007</td></tr>
<tr><td>Portion 11</td><td>T0IS00000000023200011</td></tr>
<tr><td rowspan="3">Uitgedacht 229 IS</td><td>Remainder of Portion 1</td><td>T0IS00000000022900001</td><td rowspan="3">8</td><td rowspan="3">T0IS00000000023200008</td></tr>
<tr><td>Remainder of Portion 3</td><td>T0IS00000000022900003</td></tr>
<tr><td>Portion RE4</td><td>T0IS00000000022900004</td></tr>
</table>

		Portion 5	T0IS00000000022900005			
		Portion 12	T0IS00000000022900012			
		Portion 13	T0IS00000000022900013			
		Portion 14	T0IS00000000022900014			
		Portion 15	T0IS00000000022900015			
		Portion 16	T0IS00000000022900016			
		Portion 17	T0IS00000000022900017			
		Portion 18	T0IS00000000022900018			
		Portion 7	T0IS00000000022900007			
		Portion 8	T0IS00000000022900008			
	Bankpan 225 IS	MA 2 on Portion 2	T0IS00000000022500002		Remaining Extent	T0IS00000000023200000
	Schurwekop 227 IS	Portion 3	T0IS00000000022700003		11	T0IS00000000023200011
		Remainder of Portion 4 RES	T0IS00000000022700004			
		Portion 12	T0IS00000000022700003			
		Portion 13	T0IS00000000022700013		13	T0IS00000000023200013
	Forzando North (381MR)			Uitgedacht 229 IS	7	T0IS00000000022900007

	Bankpan 225 IS	RE 1	T0IS000000000022500001	
		Portion 7	T0IS000000000022500007	
		RE 14	T0IS000000000022500014	
		Portion 15 (of 14)	T0IS000000000022500014	
		Portion 16 (of 14)	T0IS000000000022500014	
	Koppie 228 IS	RE	T0IS000000000022800000	
		RE 1	T0IS000000000022800001	
		Portion 2	T0IS000000000022800002	
		Portion 3	T0IS000000000022800003	
		Portion 5 (of 1)	T0IS000000000022800001	
		Portion 7	T0IS000000000022800007	
	Weltevreden 193 IS	Portion 1	T0IS000000000019300001	
		Mineral Area 2 (Portion of MA 1)		
		Portion 9 (of 2)	T0IS000000000019300002	

		Portion 10 (of 2)	T0IS00000000019300002	
	Halfgewonnen 190 IS	Mineral Area 3	T0IS00000000001900000	
	Geluk 226 IS	RE of Mineral Area 1	T0IS00000000002260000	

2.1 LOCALITY MAP

Figure 1 and Figure 2 below illustrates the proposed Kalabasfontein project area which form the basis of this EIA application.

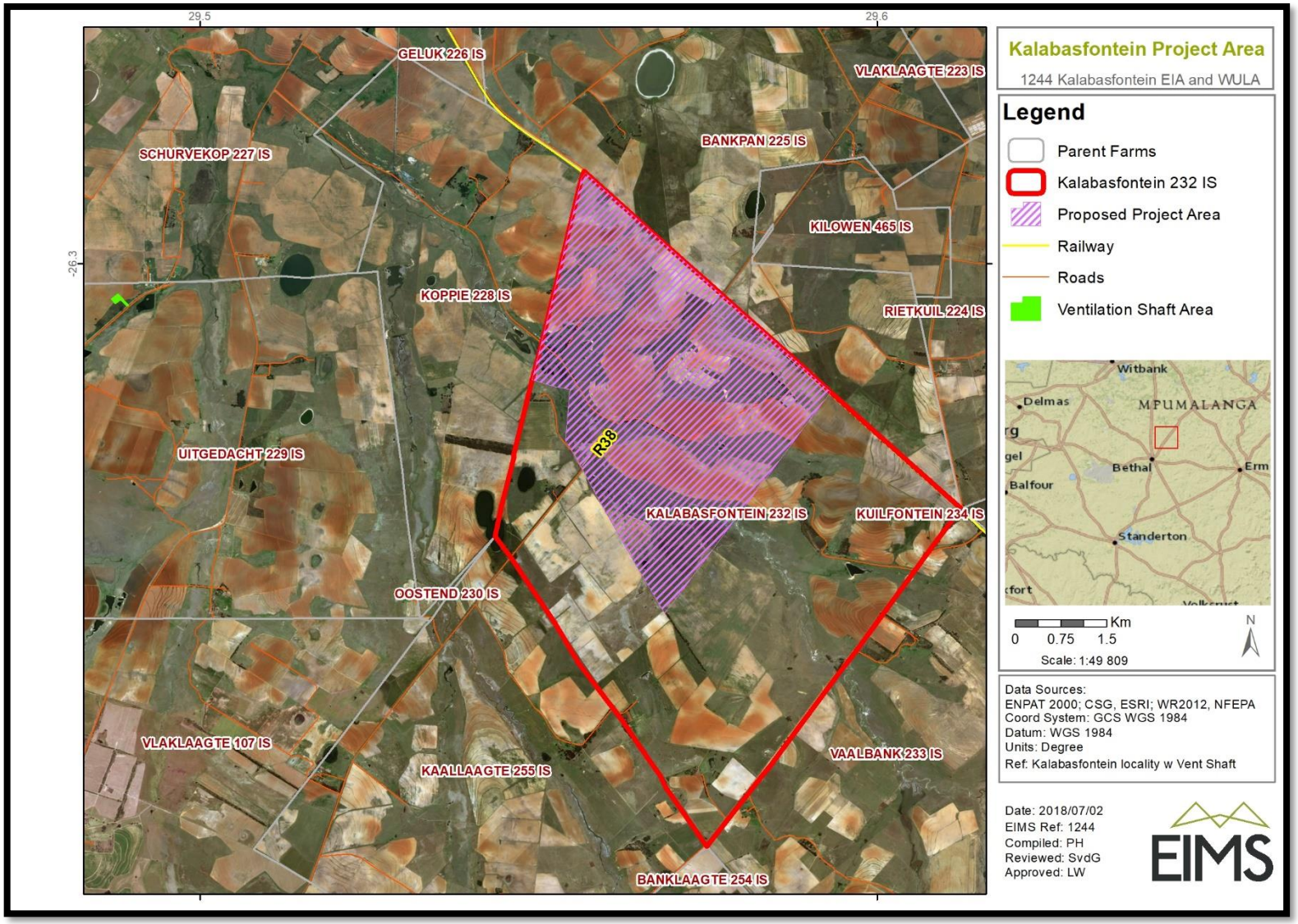

Figure 1: Locality map of Kalabasfontein project area and new ventilation shaft on Portion 7 of the farm Uitgedacht 229 IS

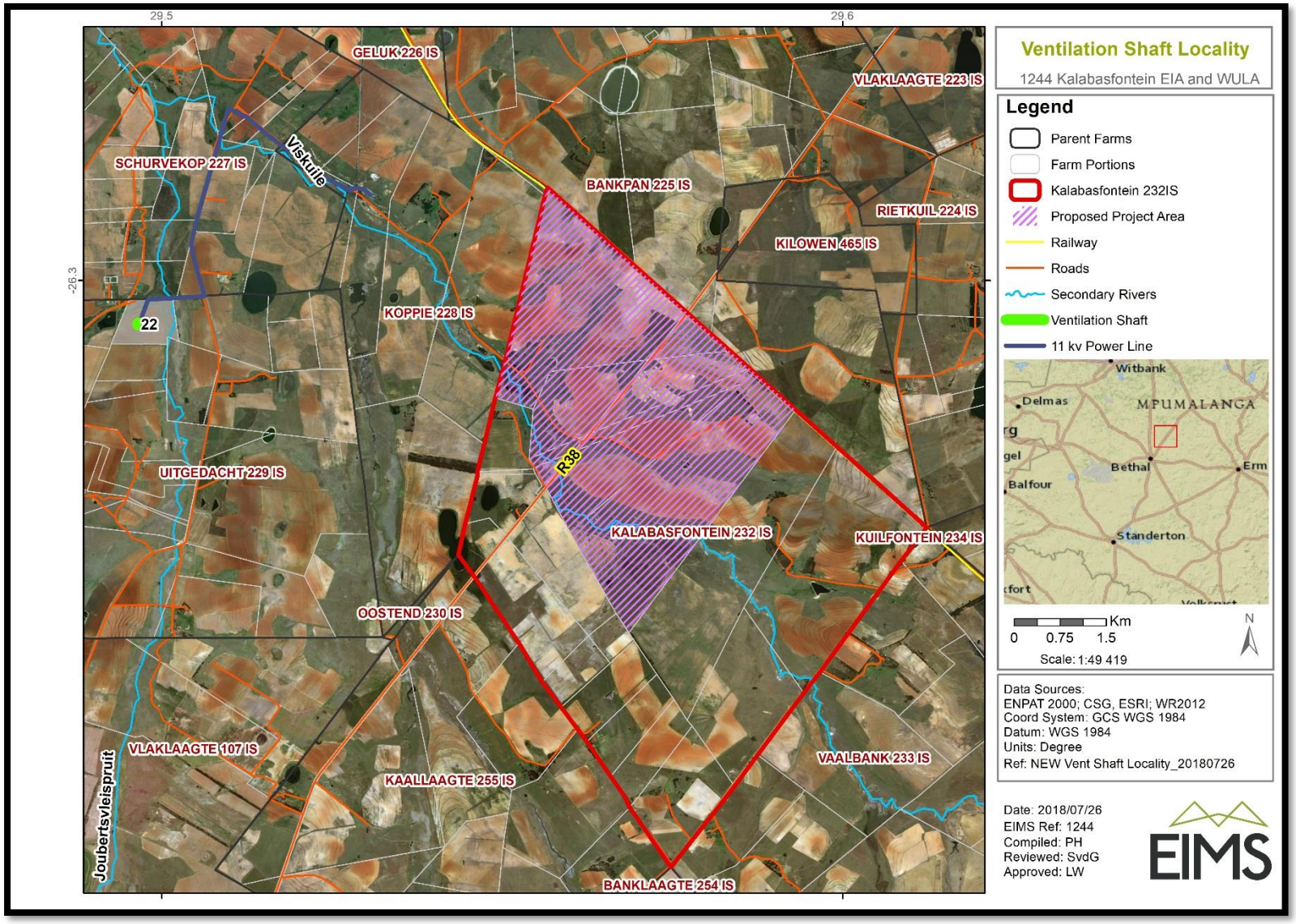
29.5
29.6
-26.3
GELUK 226 IS
VLAKLAAGTE 223 IS
SCHURVEKOP 227 IS
Viskuile
BANKPAN 225 IS
RIETKUIL 224 IS
KILOWEN 465 IS
22
KOPPIE 228 IS
UITGEDACHT 229 IS
R38
KALABASFONTEIN 232 IS
KUILFONTEIN 234 IS
OOSTEND 230 IS
VLAKLAAGTE 107 IS
Joubertsvleispruit
KAALLAAGTE 255 IS
VAALBANK 233 IS
BANKLAAGTE 254 IS
Ventilation Shaft Locality
1244 Kalabasfontein EIA and WULA
Legend
Parent Farms
Farm Portions
Kalabasfontein 232IS
Proposed Project Area
Railway
Roads
Secondary Rivers
Ventilation Shaft
11 kv Power Line
Witbank
Delmas
MPUMALANGA
Bethal
Balfour
Standerton
Km
0 0.75 1.5
Scale: 1:49 419
N
Data Sources:
ENPAT 2000; CSG, ESRI; WR2012
Coord System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
Ref: NEW Vent Shaft Locality_20180726
Date: 2018/07/26
EIMS Ref: 1244
Compiled: PH
Reviewed: SvdG
Approved: LW
EIMS

Figure 2: Location of the Kalabasfontein project and the new ventilation shaft on Portion 22 of the farm Uitgedacht 229IS

3 DESCRIPTION AND SCOPE OF THE PROPOSED ACTIVITY

This section provides a detailed project description. The aim of the project description is to indicate the activities that are planned to take place at the Forzando South operations as well as the proposed Kalabasfontein project area and amendments that are being applied for in this application. Furthermore, the detailed mine/project description is presented to facilitate the understanding of the project related activities which result in the impacts identified and assessed and for which management measures have been proposed.

3.1 MINING OPERATIONS OVERVIEW

Although Kalabasfontein annexation is intended to extend the Life of Mine (LOM) of Forzando South Coal Mine, it will come into production a year after the annexation is granted by the DMR. The Kalabasfontein project has an estimated LOM of 17 years with the project schedule and timeframe being based on the Forzando South equipment availabilities, efficiencies and both skilled and unskilled labour force. Mining in the Kalabasfontein project area is based on two Continuous Miner (CM) sections.

The access corridor to Kalabasfontein Reserves was identified during exploration drilling. Reserves will be mined through access from one of Forzando South Reserves block. This will eliminate intense preparation work of developing a new incline, as there will be infrastructure available at the face.

Currently, Forzando South mine is scheduled until 2037. However, the Kalabasfontein portion will be mined as soon as permission is granted, in order to ensure sustained production volumes and quantities from the 5 CM sections that are currently being mined. The mine will maintain its production rate of 2.2 Million tonnes (Mt) per annum. Commissioning of Kalabasfontein will not add to the production of Forzando South but will provide relocation areas for existing Forzando South sections. Since the Kalabasfontein project will be mined concurrently with Forzando South, production decline will be due to depletion of Reserves. In the second quarter of year 17 (2037), the first section will pull out and leave the one section to deplete the remaining Reserves.

3.1.1 CURRENT AUTHORISATIONS

The following rights, authorisations and approvals are currently in place and have been considered in the compilation of the report:

- Mining Right (MP380MR) dated 28 June 2013;
- Mining Right (MP381MR) dated 28 June 2013;
- Prospecting Rights (MP 30/5/1/1/2/1035PR) dated 31 July 2015;
- Prospecting Rights (MP 30/5/1/1/2/1170PR) dated 31 July 2015;
- Water Use Licence (04/B11A/A/ACGIJ/521) dated 19 July 2011;
- Amended Water Use Licence (04/B11A/A/ACGIJ/521) dated 15 June 2017; and
- Waste Licence (12/9/11/L180/6) dated 22 February 2010.

3.1.2 INFRASTRUCTURE REQUIREMENTS

As the Kalabasfontein project will use the existing Forzando South and Forzando North infrastructure, it is envisaged that additional infrastructure requirements will be minimal. Anticipated demand for water, power and the on-site infrastructure requirements is detailed in the mine works programme (MWP). These requirements are based on staff required over the production period for permanent employees and contractors. Water and electricity requirements for the construction of mine access (ventilation shaft) and surface infrastructure are temporary, lasting for approximately 12 months. Table 3 below presents the electrical equipment that will be utilized during the underground mining operations.

Table 3: Underground mining equipment - electrical powered machines

Equipment	Activity	kW/hr power use
Feeder breaker	Sizing and feeding coal	150
Conveyor drives and take up sections	Conveying coal long distance	45
Transformers and switch gear		20
Auxiliary ventilation fans	Diluting dust and methane	15
De-watering pumps	Dewatering u/g workings	10
Material stores and crew station		5
Continuous Miner	Cutting coal	650
Shuttle cars	Conveying coal short distance	219
Twin boom roof bolter with side wall bolting capability	Roof bolting	74
Main Fan	Diluting duct and methane	180
Self-propelled diesel/ electric face drill rig	Horizontal drilling	75
Self-propelled diesel/ electric roof bolter	Back bye and roof support	60
Total		**1 503**

The Forzando North plant is designed to treat ROM of approximately 2.2 Million tons per annum (Mtpa). This will include coal from the proposed Kalabasfontein Project. The plant will be manned for operations on a 24 hour/day, 7 days/week basis, with the exclusion of statutory public holidays.

Below are plant design parameters used:

- A production of 10,000t per day;
- A production of 3,300t per shift;
- Feed to ROM bin (peak) of 3,600t per hour at 50mm Top Size;
- ROM material top size (mm): 350mm;
- Primary crusher feed: 1,200t per hour (peak);
- ROM stockpile surge capacity 10,000t (max): 4,500t (live);
- Overland conveyor design maximum and average of 1,125t/hr and 750t/hr respectively;
- Conveyor operation: 2 shifts per day for 5 days a week.

3.2 DESCRIPTION OF ACTIVITIES TO BE UNDERTAKEN

It is the intention of this Scoping Report to provide information regarding the proposed extension of the mining areas (underground) as well as to address the proposed amendments to certain existing conditions contained in the EA/EMP/WUL. The proposed project includes inter alia the following application processes with associated activities:

- New Integrated Environmental Authorisation (Scoping and Environmental Impact Report (S&EIR)) for:
    - Activity 9 of GN 983;
    - Activity 10 of GN 983;
    - Activity 12 of GN 983;
    - Activity 13 of GN 983;
    - Activity 19 of GN983;
    - Activity 24 of GN 983;
    - Activity 27 of GN 983;

- Activity 34 of GN 983;
- Activity 45 of GN 983;
- Activity 46 of GN 983;
- Activity 56 of GN 983;
- Activity 63 of GN 983;
- Activity 6 of GN 984;
- Activity 7 of GN 984;
- Activity 11 of GN 984;
- Activity 15 of GN 984;
- Activity 16 of GN 984;
- Activity 17 of GN 984;
- Activity 4 of GN 985;
- Activity 12 of GN 985;
- Activity 14 of GN 985; and
- Activity 18 of GN 985.

- New Integrated Water Use Licence (IWUL) for:
  - Section 21 (a)- Abstraction of water;
  - Section 21 (b)- Storage of water;
  - Section 21 (c)- Impeding or diverting the flow of water in a watercourse;
  - Section 21 (g)- Disposing of waste in a manner that may detrimentally impact on a water resource;
  - Section 21 (i)- Altering the bed, banks course or characteristics of a watercourse; and
  - Section 21(j)- Removing, discharging or disposing of water found underground.
- Section 102 Amendment:
  - Revised Mine Works Programme; and
  - Revised consolidated EMPR.

3.2.1 THE MINERAL RESOURCES

The exploration work to date forms the basis for the current evaluation. Between 2006 and 2017, a total of 88 boreholes have been drilled with the aim of:

- Increasing the confidence level of the Resource in terms of both structure and washability data;
- Investigating possible extension to the Resource;
- Obtaining more information on dolerite activities; and
- Delineating potential access corridor/s into the area.

Coal measures at Kalabasfontein are hosted within an approximately 160m thick horizon consisting of sandstone and siltstone, subordinate mudstone and shale within the Vryheid Formation of the Ecca Group of the Karoo Super group.

Five main coal seams are recognized in the area, named, from base upwards as, S1, S2, S4, S5 and S6. The thickness and distribution of the seams are controlled by the palaeo-topography and predepositional events with seams having been modified by syn-depositional events (mainly influxes of detrital material as well as compaction of the sedimentary pile), dolerite intrusions and later by the erosion that sculpted the modern-day topography.

The most laterally consistent and thickest coal seams are contained in the S4 zone, while the S1 and S2 are restricted to the glaciated valley areas. S5 is only present in topographically high areas, having been removed by erosion elsewhere, whilst the S6 is only preserved in a very small area of high topographical relief.

Seam splitting is a common feature in the area. This is fundamentally attributed to the proximity to the Smithfield Ridge and thus the provenance of detrital material. S2 may be split into S2U and S2L while S4 is split into three sub seams, S4L, S4U and S4A (See Figure 3). Furthermore, S4A may be split into S4A1 and S4A2. S5 is generally split into the S5 and S5L.

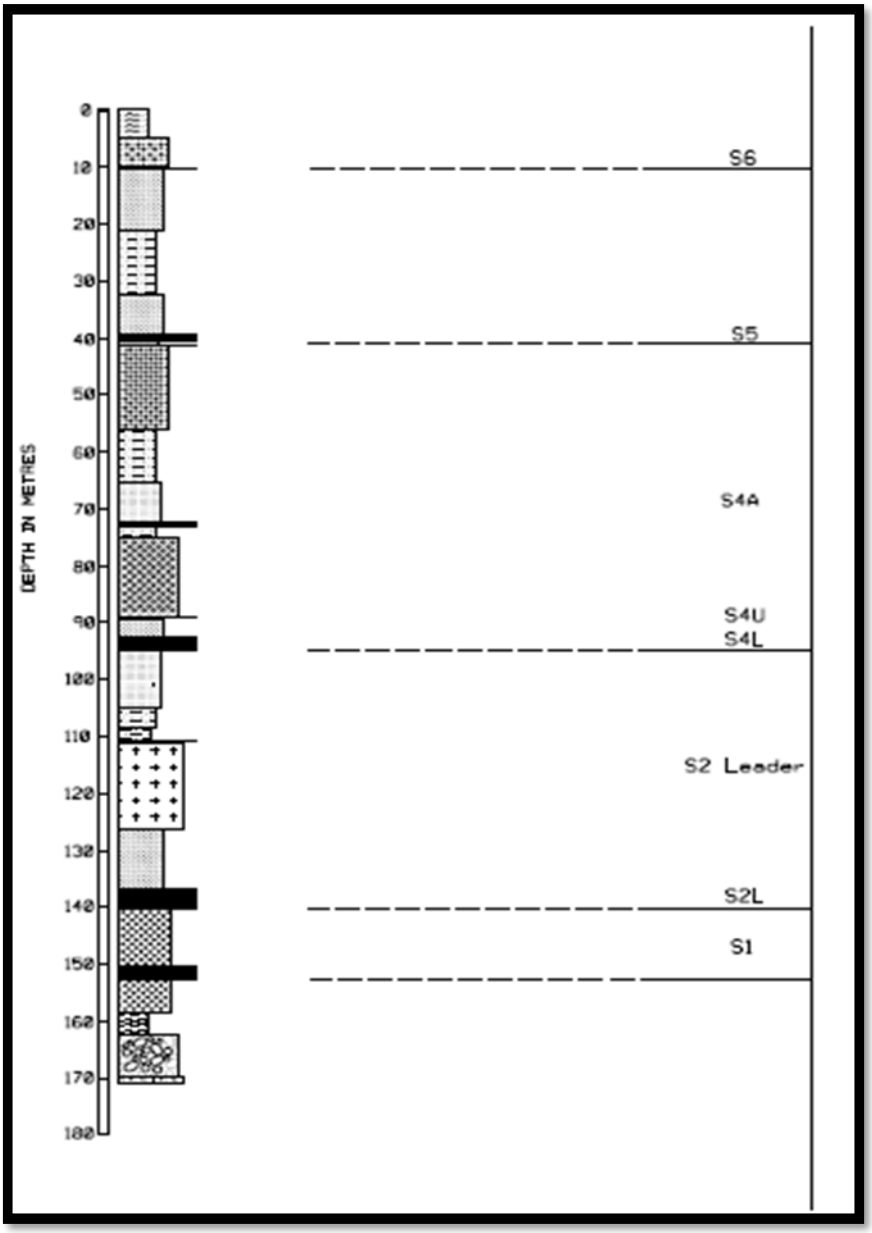

Figure 3: Stratigraphic column for the Vryheid formation

3.2.1.1 NO. 1 SEAM

No. 1 Seam is found either very close to or on top of the Dwyka Formation. It is sporadically developed in palaeo-topographic lows and generally has thicknesses of less than 1.0m. Seam thickness distribution.

3.2.1.2 NO. 2 SEAM

No. 2 Seam is found above the No. 1 Seam, it is developed in palaeo-topographic lows and inconsistent in nature. The seam is mainly developed in the eastern, southern and northern portions of the project area. In some areas, it has been displaced by dolerite activity and extensive devolatilised leaving some pockets of unaffected blocks of coal. It comprises a mixture of interbedded shales and coal bands, resulting in variable qualities with high ash content. Its thickness varies from 0.13m to 3.03m as illustrated in Figure 6.

3.2.1.3 NO 3 SEAM

No. 3 Seam has not developed in the project area.

3.2.1.4 NO. 4 LOWER SEAM

No. 4 Lower Seam is the only seam that is potentially mineable as it is consistent, thick enough, and of sufficient quality in the project area. Its thickness varies from 0.02m to 2.78m. In some areas the seam has been displaced by dolerite activity. The seam comprises millimetre-to-centimetre-banded coal with predominantly bright and lustrous coal bands. Occasional shaley zones are also present in the area. Siderite and pyrite nodules are dispersed throughout the seam and calcite in-filling cleats and joints. Though not as pronounce, the floor elevation contours mirror those of the top of Dwyka.

3.2.1.5 NO. 4 UPPER SEAM

No. 4 Upper Seam occurs over most of the project area. It is a relatively thin (less than 1.0) and poor in quality to be considered economic. Its thickness ranges from 0.21m to 0.96m.

3.2.1.6 NO. 5 SEAM

No. 5 Seam is only present in topographic highs and has been eroded in lower lying areas. There is a consistent shale parting within this seam which renders it uneconomical. Where present, its thickness ranges from 0.02m to 1.86m

3.2.2 MINING METHOD TO BE EMPLOYED: UNDERGROUND MINING

Bord and pillar mining using CM's was selected as the primary extraction method. In bord and pillar mining, parallel roads are developed in the development direction. Perpendicular roads, called splits, are developed at predetermined intervals to the parallel roads (see Figure 4). These roads interlink, creating pillars. The roads mined concurrently are determined by the size of the pillars required to support the overburden above the coal seam and the length of the production equipment trailing cables. Pillar size is determined by the safety factor formula; which is the pillar strength divided by the pillar load (mass of the overburden carried by the pillar). Panel design will be based on either the Probability of Failure (PoF) or the safety factor design criterion. A PoF of 0.1% or SF of 2.0 will be used for main development, whereas a PoF of 1% or SF of 1.6 will be used for production panels depending on the stability and rock engineering characteristics that will be determined by a Rock/Geotechnical Engineer. The dimensions of the roads and the support requirements are determined by a Geotechnical Engineer and documented in a code of practice for the prevention of roof falls as illustrated below.

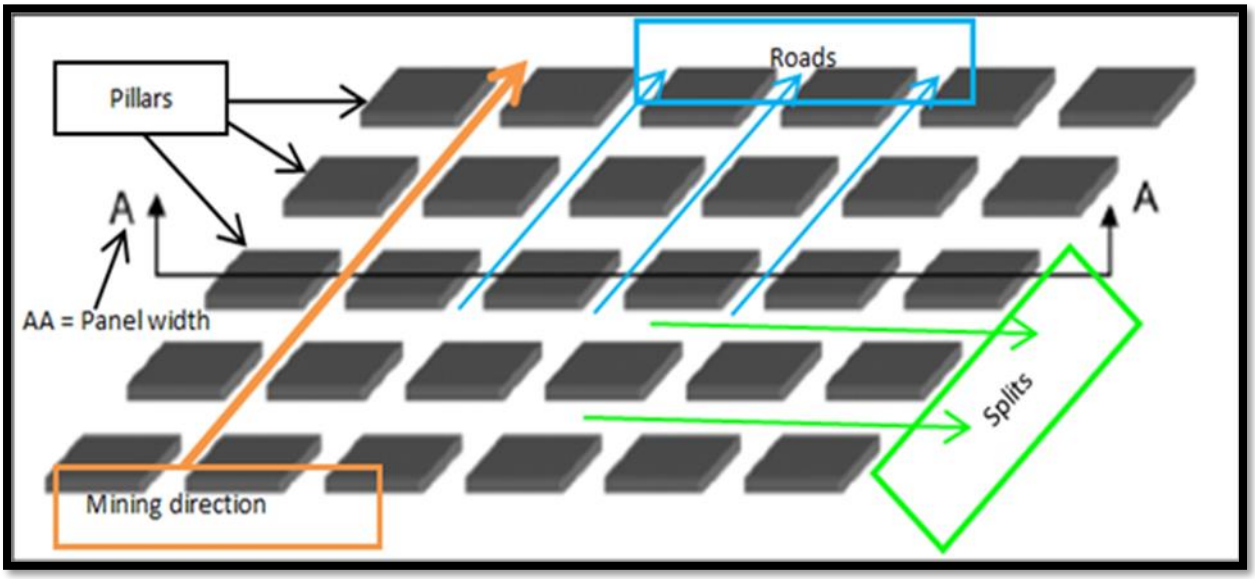

Figure 4: Typical board and pillar mining panel layout for underground extraction

3.2.3 MINE PRODUCTION RATE

Currently, Forzando South mine is scheduled until 2037. However, the Kalabasfontein project portion will be mined as soon as permission is granted, in order to ensure sustained production volumes and quantities from the 5 CM sections that are currently mining. The mine will maintain its production rate of 2.2Mt per annum. Commissioning of Kalabasfontein will not add to the production of Forzando South but will provide relocation areas for existing Forzando South sections. Figure 5 below indicates the production schedule over the estimated LoM of 17 years.

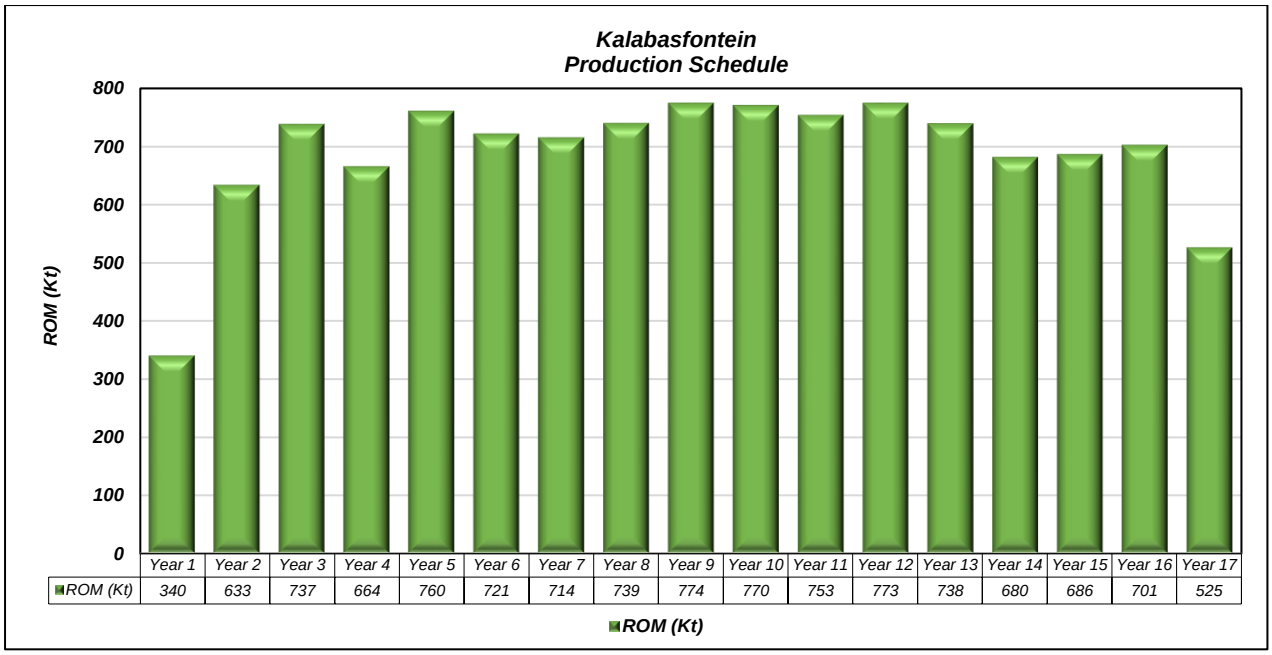

Figure 5: Kalabasfontein production schedule

The tables below show the yearly Run of Mine (ROM) and product production schedule for Kalabasfontein project.

Table 4: Seam 4 Lower ROM tonnes

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
ROM Tonnes [Mt]	0.3	0.6	0.7	0.7	0.8	0.7	0.7	0.7	0.8
RD [t/m³]	1.79	1.79	1.76	1.66	1.74	1.76	1.8	1.78	1.77
Ash Content [%]	43.5	43.5	44.3	35.9	39.2	42.2	46.9	46	42.8
Calorific value [MJ/kg]	17.5	17.6	17.7	20	18.6	17.2	15.7	15.9	16.6
Total sulphur [%]	1.40	1.40	1.30	1.30	1.40	1.60	1.50	1.40	1.30
Description	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**	**Year 16**	**Year 17**	**Total**
ROM Tonnes [Mt]	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.5	**11.7**
RD [t/m³]	1.79	1.8	1.85	1.81	1.74	1.74	1.74	1.74	**1.77**
Ash Content [%]	44.7	46.1	48.7	46.4	41.8	40.7	40.5	40.8	**43.3**
Calorific value [MJ/kg]	16.2	15.4	14.8	15.8	17.5	17.7	17.8	17.9	**17.0**
Total sulphur [%]	1.30	1.50	1.30	1.30	1.40	1.60	1.70	1.60	**1.42**

Table 5: Seam 4 Lower product based on export thermal coal specifications

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Product Tonnes [Mt]	0.2	0.3	0.4	0.4	0.5	0.4	0.3	0.4	0.4
Calorific value [MJ/kg]	25.5	26.3	26.3	26.3	26	25.1	25.5	25.1	25.2
Total sulphur [%]	1.40	1.50	1.30	1.30	1.40	1.40	1.40	1.40	1.40
Yield [%]	50.2%	52.3%	52.7%	61.8%	56.9%	53.9%	44.5%	47.1%	50.6%
Description	**Year 10**	**Year 11**	**Year 12**	**Year 13**	**Year 14**	**Year 15**	**Year 16**	**Year 17**	**Total**
Product Tonnes [Mt]	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	**6.3**
Calorific value [MJ/kg]	25.1	25.1	25.2	25.1	25.7	25.3	25.3	25.3	**25.5**
Total sulphur [%]	1.30	1.40	1.30	1.40	1.40	1.30	1.40	1.40	**1.37**
Yield [%]	47.2%	46.0%	43.3%	47.0%	54.7%	53.8%	50.4%	49.2%	**51.0**

3.2.4 MINERALS PROCESSING

Although Forzando complex has two mines, namely Forzando North and Forzando South, Kalabasfontein ROM will be crushed at Forzando South prior to conveying to Forzando North beneficiation plant for processing. Beneficiated coal is railed by means of a rapid loader to Richards Bay Coal Terminal (RBCT) and then shipped from the harbour to clients overseas. All existing surface infrastructure will be retained to service production from Forzando South inclusive of Kalabasfontein Project.

The following section provides more information on the wet and dry stages of the plant process as illustrated in Figure 6.

3.2.4.1 DRY STAGE:

The raw coal is transported from a ROM stockpile by front end loaders and fed into a shallow hopper. The coal is then fed by conveyor to a feeder breaker where the coal is reduced to a size smaller than 400mm before conveyed to a primary crusher for reduction to the size to smaller than 75mm. A primary dry screen removes oversize coal (greater than 75mm) for re-crushing and raw duff (smaller than 3mm) for sale or to stockpile while the 75mm x 3mm product is conveyed to a secondary dry screen. The secondary dry screen removes the coal fractions that are larger than 25mm in size and transfer it to a wet screening section, with the coal fragments smaller than 25mm being conveyed to a transfer point for feeding to a surge bin which feeds to the two Heavy Medium Settlers (HMS) plants. Any coal material larger than 75mm is transferred to a secondary crusher for reduction and returned to the circuit.

3.2.4.2 WET STAGE:

The wet screen section consists of a rinsing screen to remove any retained coal fragments with a size smaller than 6mm, followed by a picking belt to remove obvious waste in the coal material larger than 25mm. The material is then transferred to a final dry screen where the large nuts (45mm – 75mm) and small nuts (25mm – 45mm) are removed. Any undersized coal fragments are returned to the ROM feed point. Note that this stage does not use additives in the water and thus no external pollutants are added. The surge bin can feed separately, or simultaneously, the two washing plants which washes peas (25mm x 6mm or 25mm x 4mm) and duff (6mm x 1mm or 4mm x 1mm) in a cyclone, plus fine coal (1mm x 0.1mm) in the spirals section. Magnetite grains are used as a heavy density medium in the flotation circuit. This is the only additive used in the plant process and has no water pollution potential.

The slurry (smaller than 1.5mm) is piped to a settling pond system (water to solid ratio of 5,7:1) where the water is reclaimed and returned to the washing plant for reuse. Solid discards from the cyclones and spiral plant are hauled to the discard dump for disposal. Table 6 presents the anticipated cost of operating the processing plant over a ten year period.

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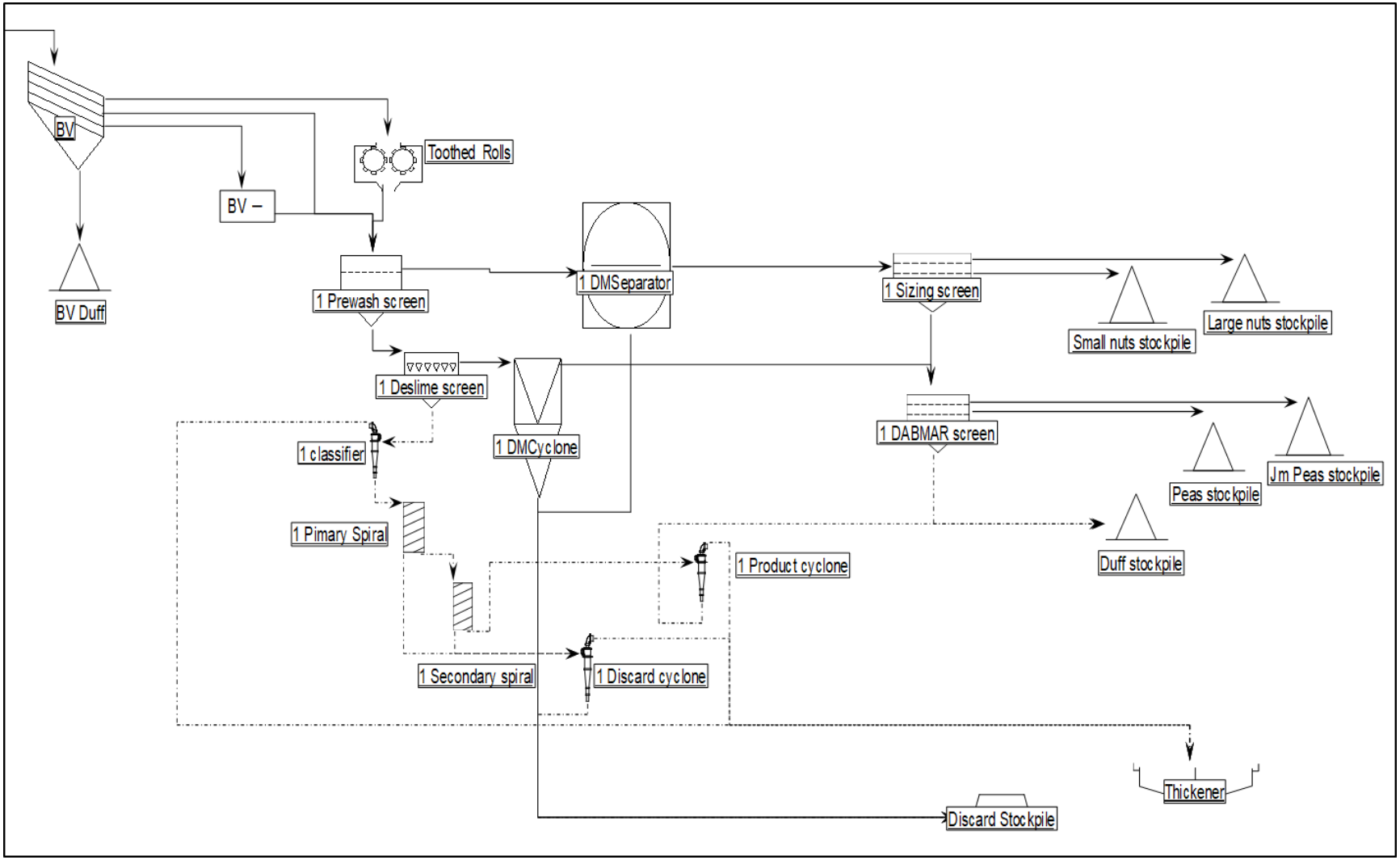

Figure 6: Forzando coal DMS plant.

Table 6: Processing plant operating cost forecast

Cost Category [R Million]	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Electricity	*2.60*	*5.12*	*6.45*	*7.24*	*7.84*	*7.35*	*6.44*	*7.38*	*8.70*	*8.49*
Water	*0.21*	*0.41*	*0.51*	*0.57*	*0.62*	*0.58*	*0.51*	*0.59*	*0.69*	*0.67*
Laboratory & Weighbridge	*0.49*	*0.79*	*1.00*	*1.12*	*1.21*	*1.13*	*0.99*	*1.14*	*1.34*	*1.31*
ROM stockpiles costs	*0.96*	*1.49*	*1.88*	*2.11*	*2.28*	*2.14*	*1.88*	*2.15*	*2.53*	*2.47*
Product stockpiles costs	*1.06*	*1.66*	*2.09*	*2.34*	*2.54*	*2.38*	*2.08*	*2.39*	*2.81*	*2.75*
Other (contractor costs)	*13.44*	*16.40*	*20.67*	*23.21*	*25.14*	*23.56*	*20.64*	*23.65*	*27.87*	*27.21*
Total [R million]	***18.76***	***25.87***	***32.60***	***36.59***	***39.63***	***37.14***	***32.54***	***37.30***	***43.94***	***42.90***

3.2.5 RESIDUE STOCKPILES

3.2.5.1 RUN OF MINE STOCKPILES

Purpose of the ROM stockpile is two-fold:

- To provide a buffer between the primary crusher and overland conveyor feed for feed rate control; and
- To provide surge capacity for when the overland conveying system is down.

Although Forzando complex has two mines, namely Forzando North and Forzando South, Kalabasfontein ROM will be crushed at Forzando South prior to conveying to Forzando North beneficiation plant for processing. Beneficiated coal is railed by means of a rapid loader to Richards Bay Coal Terminal (RBCT) and then shipped from the harbour to clients overseas. All existing surface infrastructure will be retained to service production from Forzando South inclusive of Kalabasfontein Project.

3.2.5.2 NON-CARBONACEOUS STOCKPILES

All discard will be stored on a discard dump and be rehabilitated /cladded as mining progresses. All product coal is stored on existing product stockpiles until it is transported to clients. As described in section 3.2.7.1, Forzando North and South operations currently have a ROM coal stockpile and a coal product stockpile as well as a coal discard dump.

3.2.5.3 CARBONACEOUS STOCKPILES

The only coal waste anticipated is coal that may fall off trucks at the ROM stockpile prior to transportation. This will be collected and transported to the existing Forzando plant off-site.

All product coal is stored on existing product stockpiles until it is transported to clients. As described in section 3.2.7.1, Forzando North and South operations currently have a ROM coal stockpile and a coal product stockpile as well as a coal discard dump. ROM coal is beneficiated as produced. An emergency stockpile is provided to cater for situations when beneficiation is not matched with ROM production. This stockpile increases and decreases in volume as “balancing” between the ROM production rate and the beneficiation rate are required.

3.2.5.4 SOIL STOCKPILES

Before any construction activities are undertaken, the vegetation will be removed, and the topsoil will be stripped and stockpiled. This will apply to the construction of the ventilation shaft. It is anticipated that existing stockpile areas will be used for this purpose.

3.2.6 WASTE

The following types of solid waste will be generated by the proposed Kalabasfontein project:

- Domestic waste;
- Hazardous waste;
- Industrial and mine waste; and
- Mine residue.

The existing Forzando facilities will be utilised to temporarily store waste and all waste will be collected by an approved, registered waste contractor for removal and final disposal. No landfill will be established on the proposed Kalabasfontein project site.

3.2.6.1 DOMESTIC WASTE STREAMS

The design philosophies for waste management are based on applicable legislation (in particular NEMWA), DWAF best practice guidelines and currently accepted good industry practice for waste management. The key principles of waste minimisation reuse and recycling are implemented wherever possible.

All domestic waste is collected in bins on site, it is removed and separated by a licensed waste management company, who responsibly disposes of all waste at the domestic waste site in Hendrina. The design philosophies for waste management are based on applicable legislation (in particular NEMWA), DWAF best practice guidelines and currently accepted good industry practice for waste management. The key principles of waste minimisation reuse and recycling are implemented wherever possible.

3.2.6.2 HAZARDOUS WASTE STREAMS

Hydrocarbon containing waste (used oil, dirty diesel and grease) will be stored in clearly marked skip bins (solids) and containers (liquids). These will be placed in existing waste storage areas. When full, the containers will be collected by a contractor for safe disposal or recycling companies which will be appointed to collect waste. All hazardous chemicals are disposed of at a permitted hazardous waste disposal facility. A waste disposal certificate will be required from the contractor to ensure safe disposal.

3.2.6.3 INDUSTRIAL AND MINING WASTE STREAMS

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.

3.2.6.4 MINE RESIDUE

There are two waste outputs arising from coal beneficiation, namely coal discards and coal slurry. Coal slurry is deposited on a coal discard dump. Currently, the mine operates one discard dump (Dump no. 3) and the other dumps (Dump 1, 2A, 2B and 2C).). Slurry is disposed in dump 3 currently. Dump 1, 2A, 2B and 2c are currently be reclaimed.

3.2.7 SURFACE INFRASTRUCTURE

As the Kalabasfontein project will use the existing Forzando South and Forzando North infrastructure, it is envisaged that additional infrastructure requirements will be minimal. A ventilation shaft will be required, this will be located outside the Kalabasfontein project area, either on portion 7 or portion 22 of the farm Uitgedacht 229 IS approximately 6km away, as indicated in Figure 1. Existing access roads will be used, however, the need to expand these will be determined during the EIA phase of the project.

3.2.7.1 ADMINISTRATION BUILDINGS, ENGINEERING BAYS, WORKSHOPS AND OTHER BUILDINGS

As the Kalabasfontein project will be an extension of the Forzando South operations, it anticipated that the existing infrastructure will be utilized during all phases of the project. The existing surface infrastructure related to Forzando North can be summarised as follows:

- Coal beneficiation plant;
- Coal discard dumps;
- Rail line of about 1,6 km to the Richards Bay Coal Terminal railway line;
- Rail loop of about 400 m diameter;
- Coal product load-out stockpile located to the west of the discard dump;
- ROM coal stockpile;
- Water pollution control dams;
- Metallurgical coal stockpiles; and
- Administration, workshops, change house and related buildings.

At present the existing surface infrastructure related to Forzando South can be summarised as follows:

- Power lines;
- Ventilation shafts (one upcast & one downcast);
- ROM coal stockpile;
- Overland conveyor from boxcut to Forzando North plant;
- Water pollution control dams; and
- Administration, workshops, change house and related buildings.

3.2.7.2 HAZARDOUS GOODS STORAGE

All hazardous chemicals are disposed of at a permitted hazardous waste disposal facility. Three (3) 20,000 litre diesel storage tanks are located on the Forzando North mine site at present and one 10 000m^3 at the Forzando South site. These diesel tanks are located in and around the already impacted footprint area of the plant site. No additional diesel storage is required.

3.2.7.3 WASHBAY

The existing coal washing facilities will be used. 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.

3.2.7.4 WEIGH BRIDGE

Existing facilities will be used.

3.2.7.5 SITE ACCESS AND CONTROL

The infrastructural area of the mine is fenced and access is controlled by security personnel. Access to the plant and mine site is controlled through a single entrance/exit point onto the mine footprint. Fencing has been specified as 1.8 m high razor diamond-mesh fencing. Site access and traffic flow is designed to optimise control over the flow of public, contractors and mine personnel vehicles as well as pedestrians. All visitors to the site are required to sign in at the security check point located at the entrance gate. A third party security company is utilised for the security check point and employees are required to retain proof of identification whilst on site.

3.2.8 HAUL ROADS, CONVEYORS AND TAILWAY LINES

A well-developed network of access and haul roads (tar and gravel) exists in the area that link all mining facilities for Forzando North and South. The mine site is accessible by means of a number of gravel roads, and secondary roads which is accessible from the provincial road connecting Bethal and Hendrina (R38 & R35) (see Figure 7 and Figure 8). Raw coal from the Forzando North and South sections is transported via trucks to the plant along the existing haul roads.

There is an existing conveyor system at the Forzando North plant area. The existing conveyor system connects the Forzando South and Forzando North operations, and transports coal from Forzando South towards the plant located on Forzando North.

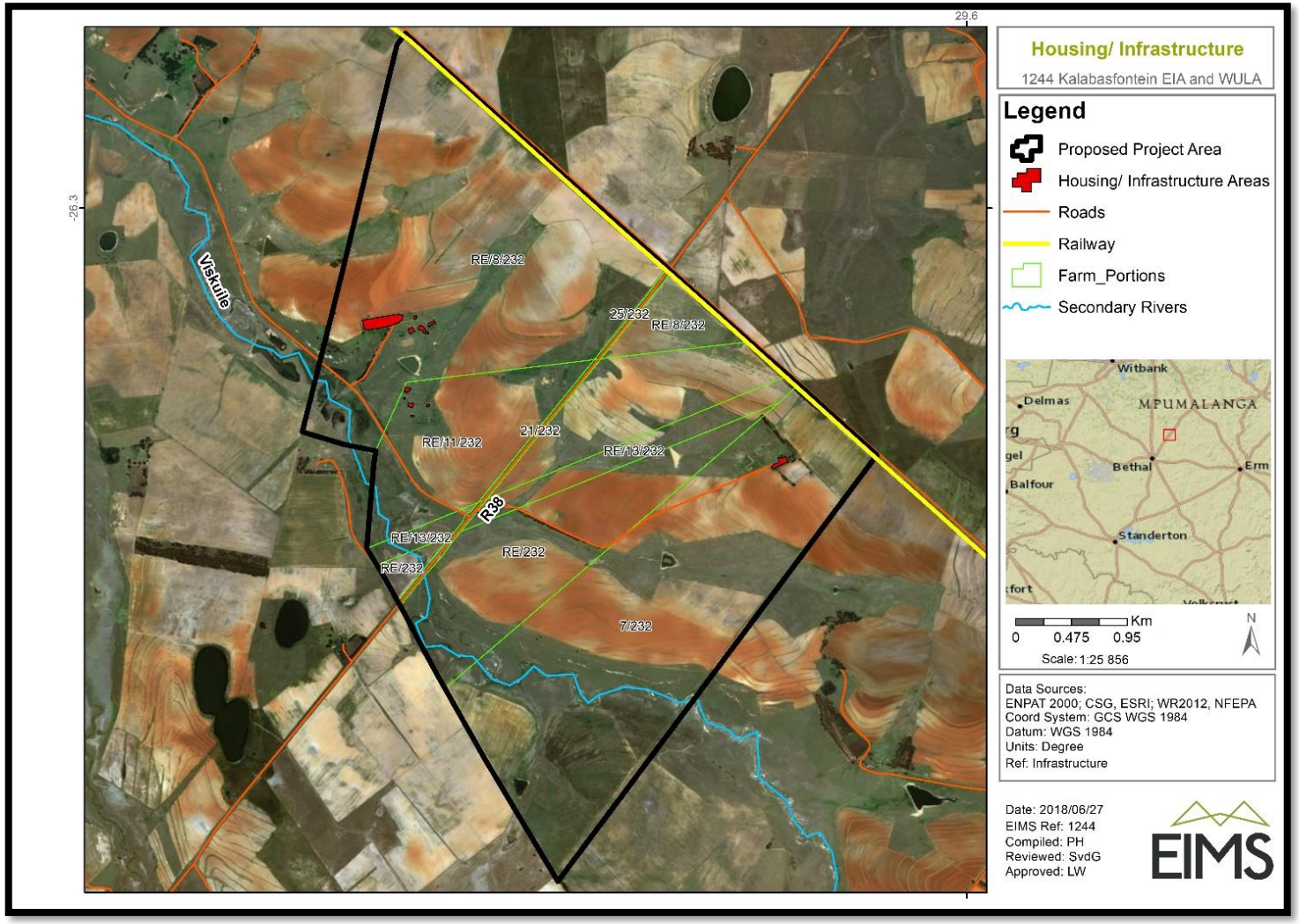

Figure 7: Road and rail Infrastructure

3.2.9 WATER SUPPLY

The proposed Kalabasfontein project will require bulk water for its mining operations as well as domestic water for drinking and ablutions purposes. Bulk water is required for dust suppression and any other mining operations that may require large volumes of water.

3.2.9.1 POTABLE WATER SUPPLY

Potable water is sourced from Usuthu Government Water Scheme, whilst industrial water is sourced from underground workings. A small RO plant is available on site that treats water from underground workings. The treated water is then used for potable purposes. About 11m^3 per day is utilised for this purpose. An estimation of the anticipated potable water demand is presented in Table 7. A preliminary water balance will be designed for the proposed Kalabasfontein project to determine bulk water requirements during peak production and a mine safety factor (to be determined) will be applied to ensure adequate water supply to the mine.

Table 7: Anticipated demand for water

Water Demand		
Underground		
Minimum Demand	Kilolitre / Month	6 824.7
Maximum Demand	Kilolitre / Month	8 341.3
Average Demand	Kilolitre / Month	7 583
Peak Demand	Litres / Second	3.22
Dust Suppression (Water Cart)		
Minimum Demand	Kilolitre / Month	16 353.9
Maximum Demand	Kilolitre / Month	19 988.1
Average Demand	Kilolitre / Month	18 171
Peak Demand	Litres / Second	7.71
Total Process Water Quantity		
Average Total	Kilolitre / Month	7 583
	Mega litres / Day	0.25
Maximum Total	Kilolitre / Month	8 341.3
	Mega litres / Day	0.28
Potable Water - Washrooms and Consumption		
Average Demand	Total Users / Day	4200
Water Demand	Kilolitre / Cap / Day	0.008
Average Daily Demand	Kilolitre / Day	34
Peak Demand	Litres / Second	0.43
Offices	Kilolitre / Day	34
Total Potable	Kilolitre / Day	34
Contingency	%	10
Allow for	Kilolitre / Day	3.4

3.2.9.2 PROCESS WATER

Design of the plant is such that all water is recycled to minimize the impact on the environment and wastage. It is estimated that the process water top up requirement would not exceed 10% of the system capacity. Water use requirement is based on the estimate of average demand based on recycling. Process water is supplied from the following sources:

- Water collected in the pollution control dams;
- Groundwater from boreholes;
- Stormwater runoff intercepted by the farm dam situated on the unnamed tributary located to the east of the mine site. Water is routed by overland pipeline from the farm dam to underground storage dams; and

- Make-up from Usuthu pipeline connection only if necessary (water from the Usutu pipeline is only used for process purpose under extreme drought situations).

Forzando South has the option to use a portion of the permitted volume 500 000m³/a (1 369m³/d) water from the Usutu Vaal Scheme for domestic purposes and coal cutting if needed. Water from the Usutu Vaal scheme, if required, is stored in a dam with the name "Clean water Erikson" or alternatively called the small Erikson dam.

There is no coal beneficiation plant at Forzando South, therefore there is no water needed in this regard. The coal from Forzando South is transported via a conveyor to Forzando North's coal beneficiation plant. Water pumped from underground for the purpose of safe mining is disposed of in PCD1. In the instance that PCD 1 reaches capacity, water can be pumped to PCD 2. In the instance that PCD2 reaches capacity, water will be pumped to Erikson dam 1. If Erikson dam 1 also reaches capacity, water will be pumped to Erikson dam 2.

Water from Erikson dam 1 and 2 is returned to underground for dust suppression and coal cutting when needed. PCD3 contains contaminated stormwater runoff from the coal stockpile area and waste sorting area. In the instance that PCD3 reaches capacity, water will be pumped to Erikson dam 1 or 2. Domestic sewage is treated in a package sewage treatment plant and the purified effluent is disposed of at PCD1 and not discharged to the natural environment.

3.2.10 CLEAN AND DIRTY WATER SYSTEMS

3.2.10.1 POLLUTION CONTROL DAMS AND ASSOCIATED DIRTY WATER MANAGEMENT

Forzando South has implemented clean and dirty water management systems in line with GN704 requirements. A stormwater diversion trench has been constructed around the offices and workshop areas. All dirty water collected on site is channelled to the PCD 3 for re-use. All dirty water is to be collected and stored with no discharge to the environment. A surface water monitoring program has been implemented in order to detect any changes in surface water quality. PCDs are de silted on a regular basis in order to maintain the required capacity of the dams.

The existing pollution control dams will be used to store waste water. This section describes the management of various waste water streams associated with the Forzando Coal Mine.

3.2.10.1.1 CLEAN AND DIRTY WATER PROCESSES

Sewerage Facilities

Domestic effluent generated is disposed of by means of two sewage plants at Forzando North and one sewage treatment plant at Forzando South. It is not foreseen that any additional sewerage facilities will be required. The domestic effluent is disposed into pollution control dam no. 4 after treatment at the sewage treatment plant at Forzando North All effluent is re-used at the plant as process water. At Forzando South the treated sewage effluent water is pumped into dam 1.

Storm Water

Contaminated stormwater runoff (from the coal stockpile area and waste sorting area) is contained in PCD3. In the instance that PCD3 reaches capacity, water will be pumped to Erikson dam 1 and 2 or allowed to flow to PCD2. The washing bay at Forzando South and the water emanating from the area including from the workshop area report to dam 3 via a system of underground concrete drain and manhole system. There is also no coal slurry and discard dump at Forzando South.

Groundwater

No groundwater from boreholes is abstracted for the Forzando South mining operation. The only abstraction of water at Forzando South is from the underground workings. PCD 1 and PCD 2 are HDPE lined. PCD3 was previously clay lined, however it is currently being concrete lined. All three of the Erikson dams are cement dams and as a result do not pose a risk on the groundwater resource of the area.

3.2.10.1.2 CLEAN AND DIRTY WATER SEPARATION INFRASTRUCTURE

Overall Mining Area

An upslope diversion structure (designed to cater for a flood event with a 50 year recurrence interval, plus 0,5m the free board) routes uncontaminated upslope stormwater runoff past the northern mine site. A dam with a capacity of 4223m³ collects runoff, which forms part of these diversion structures on Forzando North.

Existing co-disposal facilities

There are no discard or slurry disposal facilities at Forzando South. At Forzando North the co-disposa,l facilities are serviced by a system of linked pollution control dams. The mine site is serviced by a system of drains and berms routing contaminated water arising from the site to pollution control dams. Discard and slurry dam 3 is serviced by two dams, dam 6 and 7 whilst discard dump 2 is serviced by dam 1, 2 and 3. A seepage cut-off drain is located along the toe of the co-disposal facilities. The collected seepage is routed to the pollution control dams from both dumps. No treatment of contaminated water is conducted. Collected contaminated water is reused in relevant activities directly from the pollution control dams (e.g.: dust suppression).

Beneficiation Plant

Contaminated water from the beneficiation plant and stockpile areas is routed to additional pollution control dams located downslope of these areas.

3.2.11 PLAN SHOWING THE LOCATION AND AERIAL EXTENT OF PROPOSED OPERATIONS

Figure 8 below indicates the locality and extent of the Kalabasfontein project area and the surrounding properties.

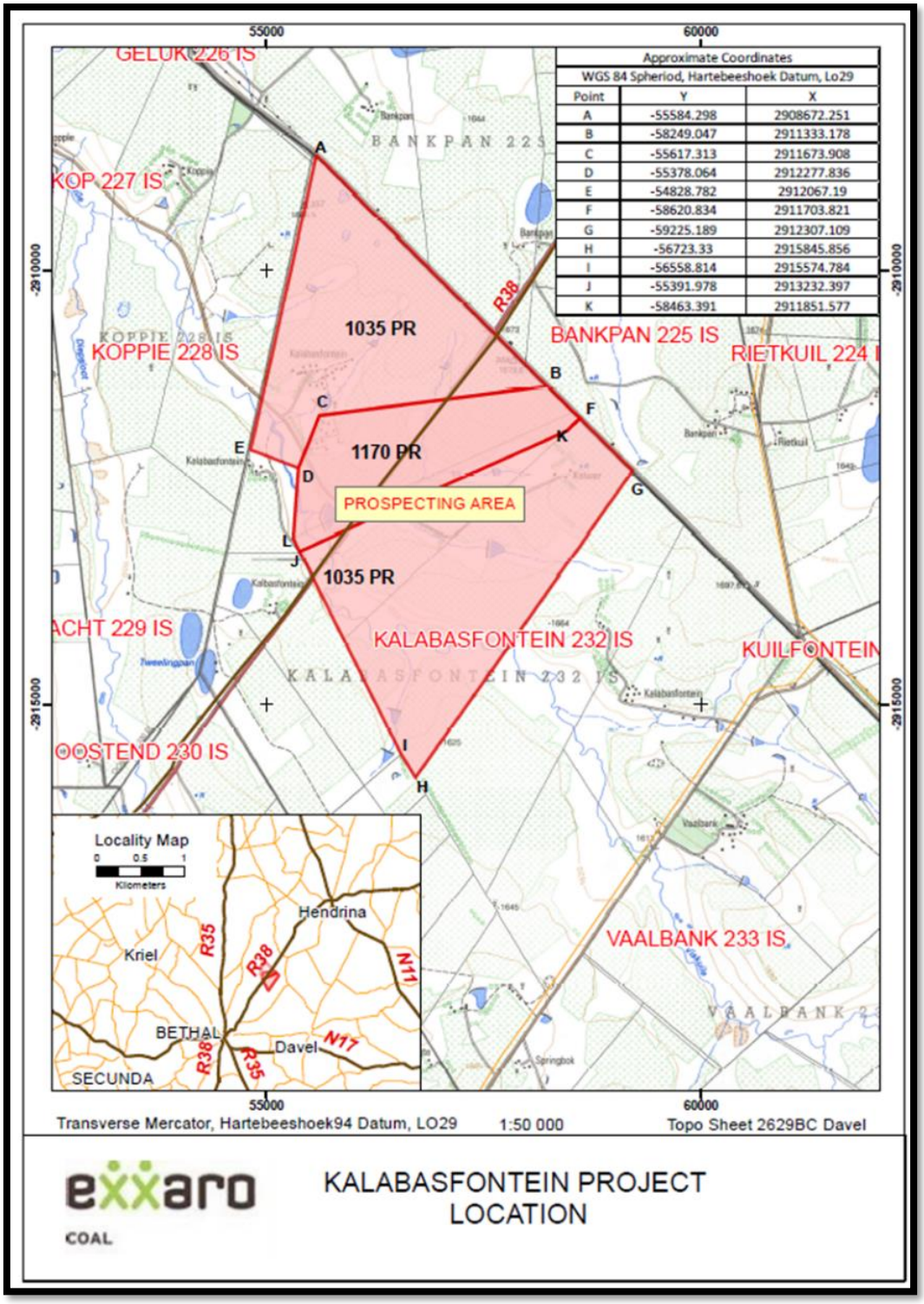

Figure 8: Location and extent of proposed project

3.2.12 BULK POWER SUPPLY

Power is supplied to the mine via a 2 by 22kV overhead power line to a surface sub-station from where it is transformed to 550V and 400V for surface use and 11KV for underground use. The anticipated power demand is presented in Table 8.

Table 8: Infrastructure requirements - Power Demand

Power		
Open Cast/Box Cut		
Average Power	*KVA*	*250*
Peak Power	*KVA*	*353.55*
Underground		
Average Power	*KVA*	*2940*
Peak Power	*KVA*	*4157.75*
Plant, Pumps & Water Treatment		
Average Power	*KVA*	*290*
Peak Power	*KVA*	*410.12*
Ringfeed (Lighting, Workshops and Offices)		
Average Power	*KVA*	*100*
Peak Power	*KVA*	*141.42*
Ventilation Fans		
Average Power	*KVA*	*950*
Peak Power	*KVA*	*1343.49*
Stockpile		
Average Power	*KVA*	*68*
Peak Power	*KVA*	*96.17*
Total Power		
Average Power	*KVA*	*4598*
Peak Power	*KVA*	*6502.5*

3.2.13 LIST OF MAIN MINING ACTIONS, ACTIVITIES AND PROCESSES OCCURRING OR TO OCCUR ON SITE

The main mining actions, activities and process that are planned to take place on site are listed in the Table 9. All actions, activities and processes have been grouped into each of the relevant project phases namely: pre-construction, construction, operation, decommissioning, rehabilitation and closure. It is important to bear in mind that Forzando Coal Mine is an existing mining operation and as such, certain of these activities/phases have already commenced (i.e.: operational phase is currently underway in certain areas). For 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;
- Decommissioning refers to the phase in which infrastructure is removed and 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.

Table 9: List of main action, activities or processes on site and per phase

Main Activity/Action/Process	Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
Site preparation	Vegetation clearance for ventilation shaft		As required	As required	As required	
	Planned placement of infrastructure		At start of phase	As required		
Human resources management	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	
	Integration with Municipalities' strategic long-term planning	At start of phase	On-going	On-going	On-going	
Earthworks	Stripping and stockpiling of soils (Ventilation shaft)		At start of phase	As required	As required	
	Cleaning, grubbing and bulldozing (Ventilation shaft)		At start of phase	As required	As required	
	Removal of 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	
	Maintenance of storm water management measures		At start of phase	As required	As required	
	Maintenance of firebreak		At start of phase	As required	As required	
Civil Works	Maintenance of infrastructure and services		At start of phase	As required		
	Mixing of concrete and concrete works		As required	As required		
	PCD and storm water/return water dam		At start of phase	As required	On-going	
	Establishment of dewatering pipelines		At start of phase	As required		

Main Activity/Action/Process	Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
	Sewage and sanitation		At start of phase	On-going	On-going	
	Existing fuel storage area		Ongoing			
	Existing chemical storage area		Ongoing			
	Existing general waste area		Ongoing	On-going		
	Access control and security		Ongoing	As required	As required	
	General site management		On-going	On-going	On-going	On-going
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		
	Establishment of internal haul roads			As required	As required	
	Removal of ore			On-going		
	Continued use of existing RoM stockpiles		Ongoing	As required	As required	
	Continued use of existing Product Stockpiles			On-going	On-going	
	De-watering of 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

Main Activity/Action/Process	Ancillary Activity	Pre-Construction	Construction	Operation	Decommissioning	Closure
Rehabilitation	Backfilling of pits and voids{underground mine and ventilation shaft)			On-going	On-going	
	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 10 below. The primary legal requirement for this project stems from the need for a Mining Right (MR) and 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 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 10: Applicable legislation and guidelines overview

Applicable Legislation and Guidelines	Reference Where Applied
APPLICABLE LEGISLATION	
Constitution of the Republic of South Africa, Act 108 of 1996 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 - (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development" Therefore, the EIA is conducted to fulfill the requirement of the Bill of Rights.	Throughout the SR and EIR process
National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) and the EIA Regulations (2014) thereunder: The NEMA (1998) requires that a project of this nature (inclusive of a Mining Right) must undergo a Scoping and Environmental Impact Assessment; an Environmental Management Programme must also be compiled. Regulations applicable to this project include the following: EIA Regulations R.982 (2014) in terms of NEMA. **Listing Notice 1: R.983 (2014) in terms of NEMA.** **Listing Notice 2: R.984 (2014) in terms of NEMA** **Listing Notice 3: R.985 (2014) in terms of NEMA.**	Throughout the SR and EIR process
Minerals and Petroleum Resources Development Act (MPRDA) (Act no 28 of 2002), as amended and Mineral and Petroleum Resource Development Regulations, 2004 as amended: 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).	Throughout the SR and EIR process

Applicable Legislation and Guidelines	Reference Where Applied
National Water Act (NWA) (Act 36 of 1998): The NWA recognizes that water is a scarce and unevenly distributed national resource which must managed encompassing all aspects of water resources. 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.	Throughout the process – all water related aspects
National Heritage Resources Act, 1999 (Act no 25 of 1999): 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 nature and extent of the project, it is likely that some heritage resources and palaeontological features are likely to occur within the project boundary area.	Heritage specialist study and Palaeontological study, EIA, EMP.
Specific Environmental Management Acts (SEMAs): 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: National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004). National Environmental Management: Air Quality Act, 2004 (Act no 39 of 2004).	Specialist studies, Baseline description and EMPR. Permits to be applied for if any protected tree species are to be removed from the site.
APPLICABLE GUIDELINES	
Integrated Environmental Management Information Guidelines series: 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: Guidelines 5: Companion to NEMA EIA Regulations of 2010. Guideline 7: Public Participation. Guideline 9: Need and desirability. Additional guidelines published in terms of the NEMA EIA Regulations, in particular: Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006. Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006. Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006.	The guidelines will be used throughout the Scoping and Environmental Impact Report process.

Applicable Legislation and Guidelines	Reference Where Applied
Best Practice Guideline (BPG) series: 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: 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	Surface water and groundwater specialist studies, EIA and EMP.

4.1 APPLICABLE NATIONAL LEGISLATION

The legal framework within which the 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. 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. 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, MWP and SLP for Forzando South Coal Mine and the proposed Kalabasfontein project area will be completed as part of the project.

In support of the amendment to the mining right submitted by Forzando Coal Mine (Pty)Ltd, the applicant is required 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 Appendix 2 of GN 982 of NEMA and Regulation 49 of the MPRDA 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 PPP commenced on 20 June 2018 with an initial notification and call to register for a period of 30

days, ending on the 20 July 2018. 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 Environmental Impact Assessment (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 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. 983, 984 and 985 and as such a full EIA process is necessary. Table 11 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:

- Activity 9 of GN 983;
- Activity 10 of GN 983;
- Activity 12 of GN 983;
- Activity 13 of GN 983;
- Activity 19 of GN983;
- Activity 24 of GN 983;
- Activity 27 of GN 983;
- Activity 34 of GN 983;
- Activity 45 of GN 983;
- Activity 46 of GN 983;
- Activity 56 of GN 983;
- Activity 63 of GN 983;

- Activity 6 of GN 984;
- Activity 7 of GN 984;
- Activity 11 of GN 984;
- Activity 15 of GN 984;
- Activity 16 of GN 984;
- Activity 17 of GN 984;
- Activity 4 of GN 985;
- Activity 12 of GN 985;
- Activity 14 of GN 985; and
- Activity 18 of GN 985.

The application for the amendment will be submitted to the competent authority prior to making the EIR/EMPR report available for review (post scoping report acceptance by the competent authority). The EIR/EMPR report (including details on, and assessment of the amendments) will be made available for a period of 30 days, in line with the required NEMA commenting period for the EIR/EMPR.

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.

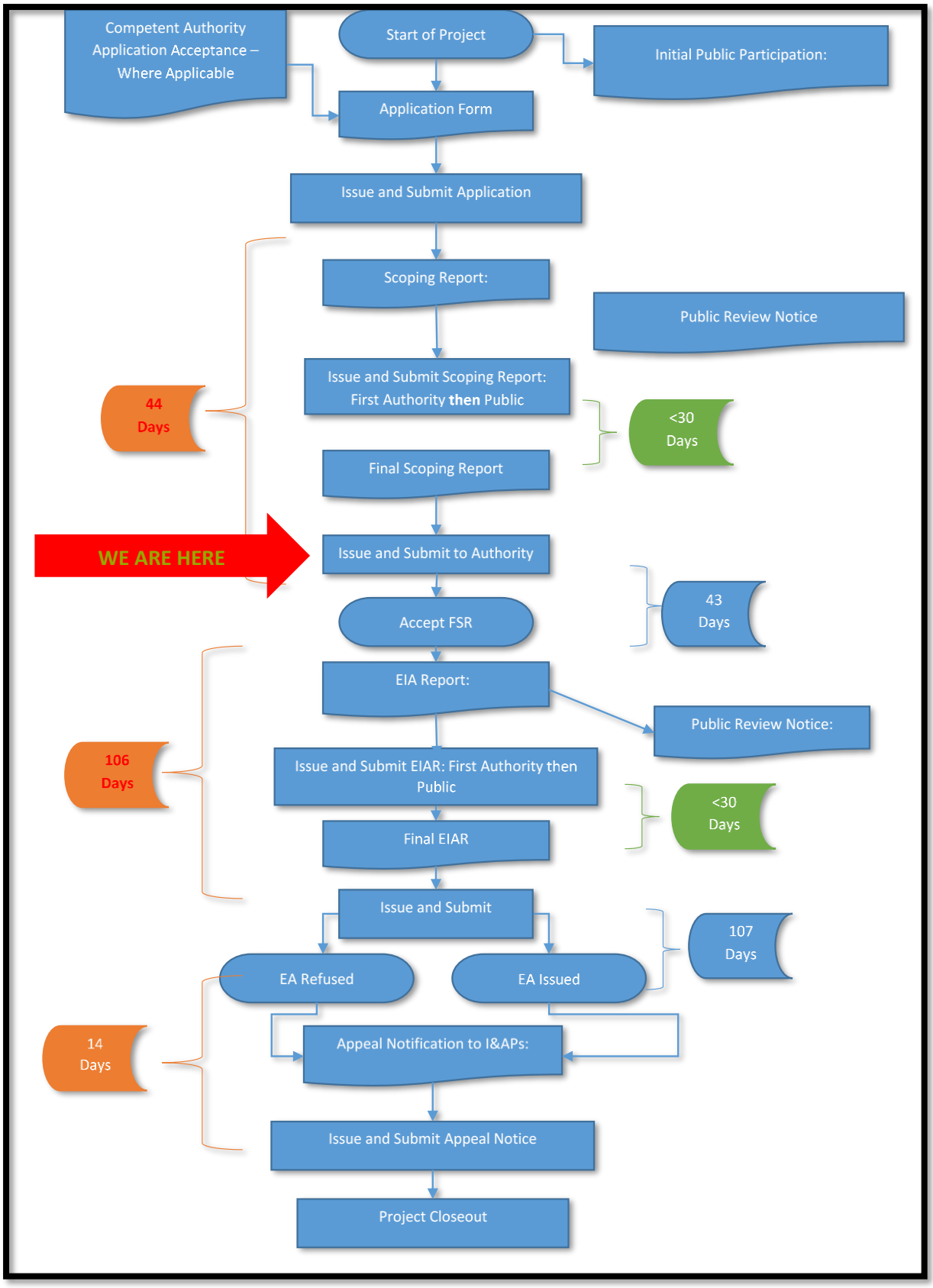

Figure 9: EIA process diagram

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 requirement for mines to comply with the NEMA financial provisioning regulations becomes effective as from January 2019 (as per the extension of the transitional period). As such, the financial provision costs in line with DMR guidelines will be presented in the EIA report.

Table 11 below indicates the Listed Activities in terms of the NEMA Regulations that have been applied for in terms of thethe proposed Kalabasfontein project. Some of these Listed Activities may not be applicable and will be confirmed by the specialist studies to be conducted during the EIA phase of the project.

Table 11: Listed activities in terms of the NEMA Regulations

GNR #	Activity Number	Description of the applicable listed activity	Trigger
		Activities in terms of NEMA (1998)	
GNR 983	9	*The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water—* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where—* *(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or* *(b) where such development will occur within an urban area.*	Water pipelines
GNR 983	10	*The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes –* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where—* *(a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or* *(b) where such development will occur within an urban area.*	Water Pipelines for Process Water for Mining
GNR 983	12	*"The development of—* *(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;*	Underground Pollution Control Dam

GNR #	Activity Number	Description of the applicable listed activity	Trigger
		where such development occurs— *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —* *excluding—* *(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(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;* *(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;* *(dd) where such development occurs within an urban area;* *(ee) where such development occurs within existing roads, road reserves or railway line reserves; or* *(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. "*	
R 983	13	*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.*	Underground Pollution Control Dam
R 983	19	*"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;* *but excluding where such infilling, depositing, dredging, excavation, removal or moving—* *(a) will occur behind a development setback;*	Underground Mining will result in excavation of more than 10 cubic metres of soils and rock from watercourse

GNR #	Activity Number	Description of the applicable listed activity	Trigger
		(b) is for maintenance purposes undertaken in accordance with a maintenance management plan; *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *(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."*	
GNR 983	24	*"The development of a road—* *(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* *(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—* *(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;* *(b) where the entire road falls within an urban area; or* *(c) which is 1 kilometer or shorter."*	Internal roads – Internal Haul Roads
GNR 983	27	*"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan."*	All infrastructure (ventilation shaft) and underground mining extension
GNR	34	*The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding—* *(i) where the facility, infrastructure, process or activity is 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;*	Infrastructure Development and use of water for Dust Suppression

GNR #	Activity Number	Description of the applicable listed activity	Trigger
		(ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15 000 cubic metres per day; or *(iii) the expansion is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will be increased by 50 cubic meters or less per day.*	
GN983	45	*The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure—* *(i) has an internal diameter of 0,36 metres or more; or* *(ii) has a peak throughput of 120 litres per second or more; and* *(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or* *(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;* *excluding where such expansion—* *(aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or* *(bb) will occur within an urban area.*	Utilization of existing pipelines
GNR 983	46	*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) has an internal diameter of 0,36 metres or more; or* *(ii) has a peak throughput of 120 litres per second or more; and* *(a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or* *(b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more;* *excluding where such expansion—* *(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*	Utilization of existing pipelines

GNR #	Activity Number	Description of the applicable listed activity	Trigger
		(bb) will occur within an urban area.	
GNR 983	56	*"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-* *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* *excluding where widening or lengthening occur inside urban areas."*	Internal roads - Upgrades to existing roads for transport of RoM to off-site minerals processing complex
GNR 983	63	*The expansion of facilities or -infrastructure for the transfer of water from and to or between any combination of the following-* *(i) water catchments;* *(ii) water treatment works; or* *(iii) impoundments;* *where the capacity will be increased by 50 000 cubic metres or more per day, but excluding water treatment works where water is treated for drinking purposes.*	Transfer of Process Water
GNR 984	6	*"The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding–* *(i) activities which are identified and included in Listing Notice 1 of 2014;* *(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;* *(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or* *(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day. "*	Pollution Control Dam

GNR #	Activity Number	Description of the applicable listed activity	Trigger
GN984	7	*The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods-* *(i) in gas form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 700 tons per day;* *(ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1000 metres in length, with a throughput capacity of more than 50 cubic metres per day; or* *(iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons day.*	Conveyors
GNR 984	11	*The development of facilities or infrastructure for the transfer of 50 000 cubic metres or more water per day, from and to or between any combination of the following.*	Pollution Control Dam
GNR 984	15	*"The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan."*	All infrastructure for underground mining extension
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 higher or where the high-water mark of the dam covers an area of 10 hectares or more."*	Pollution Control Dam
GN 984	17	*"Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—* *(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or* *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;*	General mining activities

GNR #	Activity Number	Description of the applicable listed activity	Trigger
		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.	
GN 985	4	*The development of a road wider than 4 meters with a reserve less than 13.5 meters.*	Roads
GN985	12	*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. 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*	Shaft
GNR 985	14	*The development of—* *(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.*	Pollution Control Dam
GNR 985	18	*The widening of a road by more than 4 meters; or the lengthening of a road by more than 1 kilometre.*	Haul and Access Roads

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 10.

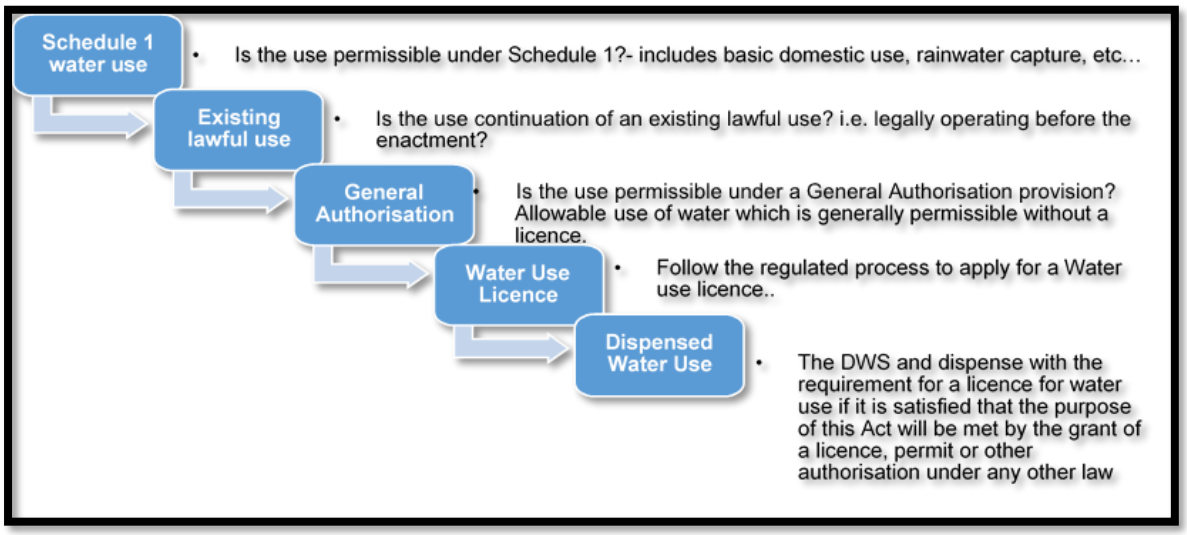

Figure 10: Authorization Process for new water uses

The NWA defines 11 water uses. A water use may only be undertaken if authorised by the DWS. Water users are required to register certain water uses that 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:

a) taking water from a water resource;

b) storing water;

c) impeding or diverting the flow of water in a watercourse;

d) engaging in a stream flow reduction activity contemplated in section 36;

e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);

f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;

g) disposing of waste in a manner which may detrimentally impact on a water resource;

h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;

i) altering the bed, banks, course or characteristics of a watercourse;

j) 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

k) using water for recreational purposes.

Total Coal SA (Pty) Ltd: Forzando South Coal Mining Operation was granted an Integrated Water Use Licence (IWUL) in terms of Chapter 4 of the NWA, Licence No: 04/B11A/A/ACGIJ/521 and File No:16/7/B100/C252, dated 19 July 2011. This licence was later amended to change the licensee name (including other amendments) to Exxaro Coal Central (Pty) Ltd: Forzando South Coal Mining Operation on 15 June 2017. The following water uses were authorized:

- Section 21(b): Storing of water;
- Section 21(c): Impeding or diverting the flow of water in a watercourse;
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on a water resource;
- Section 21(i): Altering the bed, banks, course or characteristics of a watercourse; and
- Section 21(j): Removing, discharging or disposing of water found underground.

The mine will apply for an amended IWUL to incorporate the proposed changes to the MWP and associated new water uses. The possible water uses that could be triggered are presented in Table 12 and these will be confirmed following the specialist studies and finalisation of the project proposal in the EIA phase.

Table 12: Water uses that may be applicable to mine expansion

Activity #	Listed Activity Description	Reason for Inclusion
NWA Activities		
Section 21(a)	Taking water from a water resource	Industrial water is sourced From underground workings. A small RO plant is available on site that treats water from underground workings. The treated water is then used for potable purposes. About 11m3 per day is utilised for this purpose.
Section 21(b)	Storing water	Water storage facilities
Section 21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource; and	PCD, dust suppression.
Section 21(j)	Removing, discharging or disposing of water found underground.	Dewatering underground mining areas.
Section 21 (c) and 21 (i)	21(c) Impeding or diverting the flow of water in a watercourse; and 21(i) Altering the Bed, Banks, Course or Characteristics of a Water Course	Watercourse crossings.

An important regulation under NWA is the GN704 (1999). This is a guideline document for the implementation of regulations on use of water for mining and related activities aimed at the protection of water resources.

4.1.3.1 MINE WATER MANAGEMENT POLICY POSITION (DRAFT - 2017)

Acid Mine Drainage (AMD) and related mine water impacts have in the past decade evolved to become a major environmental challenge. Whilst the challenge is limited to the mining sector during operations, it eventually becomes externalised during mining downturn, and is especially pertinent post-mining closure, especially if mine closure does not proceed according to regulatory-approved recommendations.

To deal with this challenge at a very high level, an Inter-Ministerial Committee (IMC) comprising the Ministers of Mineral Resources, Water and Environmental Affairs, Science and Technology, and the Minister in the Presidency: National Planning Commission was established. Mine water impacts, including AMD, are phenomena that plague all countries with rich mineral deposits. Depending on the geology/ mineralogy of a region, the terms Acid Rock Drainage (ARD), Acid Mine Drainage (AMD), Neutral Mine Drainage (NMD), and Saline Drainage (SD) are the characteristic nomenclature for reporting different mine water types. Given the long history of mining in South Africa, and the mineral wealth still locked across various parts of South Africa, and the potential this deposit has for local economic development and attracting foreign investment, it is prudent that the DWS formulates a policy principle to support its response to mine water challenges.

The draft policy document's purpose is to provide the position of the DWS on mine water management, including AMD. Furthermore, it aims to provide measures on protection of water resources from prospective, operational and historical mine activities that have negative water quality impacts. Based on the formulation of this policy document, it is clear that the DWS intends to focus more heavily on ensuring that the mining sector in particular, undertakes every possible action to prevent the deterioration of the surrounding water quality.

4.1.3.2 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, the proposed Kalabasfontein project right area falls within the Olifants Water Management Area, delineated as water management area No. 4 (WMA 4), which subsequently falls under the B Primary drainage area (Department of Water Affairs 2013).

4.1.4 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT

Although none of the listed activities detailed in National Environmental Management: Waste Act, 2008 (NEMWA) regulations are applicable to the Kalabasfontein project, the requirements of this act must be taken into consideration. The National Environmental Management: Waste Amendment Act came into force on 2 June 2014. 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:

1. A holder of waste must, within the holders power, take all reasonable measures to-

    a) "Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;

    b) Reduce, re-use, recycle and recover waste;

c) Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;

d) 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;

e) Prevent any employee or any person under his or her supervision from contravening the Act; and

f) Prevent the waste from being used for unauthorised purposes."

These general principles of responsible waste management will be incorporated into the requirements in the EMPR 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, owning 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."

Forzando South Coal Mine currently has a Waste Storage License with the reference number (12/9/11/L180/6) which was issued on 22 February 2010.

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

The purpose of these Regulations is to regulate the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation. The identification and assessment of environmental impacts arising from residue stockpiles and residue deposits must be done as part of the environmental impact assessment conducted in terms of the NEMA. A risk analysis based on the characteristics and the classification set out in Regulation 4 and 5 must be used to determine the appropriate mitigation and management measures. The pollution control barrier system shall be defined by the-

- National Norms and Standards for the Assessment of Waste for Landfill Disposal, 2013; and
- National Norms and Standards for Disposal of Waste to Landfill, 2013.

The planning, management and reporting of residue stockpiles and residue deposits is shown schematically in Figure 11 below.

Figure 11: Overview of the planning and management of residue stockpiles and residue deposits regulations

It is anticipated that existing stockpiling areas will be used for the proposed Kalabasfontein project and therefore there will be no requirement to identify new stockpile areas.

4.1.4.2 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. Analysis of representative samples will be discussed in the EIA phase where the characterisation of the materials will determine the required mitigation measures to be put forward in the EMPR.

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

Chapter 9 of the Waste Classification and Management 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; and

- Description of potential impacts, etc.

4.1.5 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-
    i. the protection and enhancement of the quality of air in the republic;
    ii. the prevention of air pollution and ecological degradation; and
    iii. 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.

The National Dust Control Regulations 2013 (NDCR, 2013) are promulgated under the NEMAQA and within these regulations, the standard for the acceptable dust fall rate for residential and non-residential areas is presented in Table 13.

Table 13: Acceptable dust fall rates (National Dust Control Regulations 2013).

Restriction Areas	Dust fall rate (D) (mg/m^2/day, 30-days average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1200	Two within a year, not sequential months

4.1.6 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 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).

4.1.7 THE NATIONAL FORESTS ACT

According to the National Forests Act No.84 of 1998, 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.

4.1.8 NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT

The National Environmental Management Biodiversity Act (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA as well as the protection of species and ecosystems that warrant national protection. Within the framework of this act, various regulations are promulgated which provide specific requirements and management measures relating to protecting threatened ecosystems, threatened or protected species as well as the control of alien and invasive species. An assessment of the application area will be undertaken by a biodiversity specialist and the findings of this assessment will be presented in the EIA phase. A summary of these regulations is presented below.

4.1.8.1 NATIONAL LIST OF ECOSYSTEMS THAT ARE THREATENED AND NEED OF PROTECTION (GN 1002 OF 2011)

The NEMBA provides for listing of threatened or protected ecosystems in one of the following categories:

- Critically Endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;

- Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;

- Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and

- Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

The Biodiversity Specialist will assess whether any of these threatened or protected ecosystems occur within the study area and provide recommendations on how the development should or should not proceed based on the findings of the assessment. The results of this assessment will be presented in the EIA phase of this study.

4.1.8.2 THREATENED OR PROTECTED SPECIES REGULATIONS (GNR 152 OF 2007)

The purpose of these regulations is to -

(a) further regulate the permit system set out in Chapter 7 of the Biodiversity Act insofar as that system applies to restricted activities involving specimens of listed threatened or protected species;

(b) provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;

(c) provide for the regulation of the carrying out of a specific restricted activity, namely hunting;

(d) provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;

(e) provide for the protection of wild populations of listed threatened species; and

(f) provide for the composition and operating procedure of the Scientific Authority.

4.1.8.3 ALIEN AND INVASIVE SPECIES LIST

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 will be considered and where relevant incorporated into the proposed mitigation measures and requirements of the EMPR during the EIA phase of this application.

4.1.9 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.

4.1.10 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT

The Conservation of Agricultural Resources Act (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.

4.1.11 SPATIAL PLANNING AND LAND USE MANAGEMENT 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.

4.1.12 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.

4.1.13 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.

The Noise Control Regulations 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 however the Mpumalanga Province has not done so yet and as such, the ECA Noise Control Regulations apply. These 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 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 site. South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with these regulations.

5 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

This section will examine the need and desirability of the proposed expansion project and will examine the importance of coal as a resource as well as the desirability of continuing coal mining operations at the 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 in order to meet the energy demands of the country in the short, medium and long term.

Coal produced is used locally within the region and is 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.

The South African Integrated Energy Plan highlights that coal should continue to play a role in electricity generation. In addition to this, the Integrated Resource Plan (2010-2030) identifies new coal fired power stations as a means to meet the future energy demands. These plans are in the process of being revisited however, in the absence of revised plans, the base case for energy from coal as it currently stands provides further impetus for planning for future coal production.

5.2 UNDERGROUND EXTENSION

Currently, Forzando South mine is scheduled until 2037. However, the Kalabasfontein portion will be mined as soon as permission is granted, in order to ensure sustained production volumes and quantities from the 5 CM sections that are currently being mined. Since Kalabasfontein will be mined concurrently with Forzando South, production decline will be due to depletion of Reserves. In second quarter of year 17, the first section will pull out and leave the one section to deplete the remaining Reserves. Therefore, the mine extension will extend the profitability and life of the mining operation until 2037, and potentially secure the jobs of the current employees for the foreseeable future. If the Forzando mining operations were not to be extended, the additional economic activity, skills development and available jobs would not be created and/or maintained, and the coal reserves would remain unutilised. If Forzando were not to proceed with the proposed extension of mining, 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 the area. In summary, the proposed mine project will allow the applicant to continue producing a secure, steady supply of coal until 2037.

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 14 present the needs and desirability analysis undertaken for the Kalabasfontein project.

Table 14: Needs and desirability analysis for the Kalabasfontein project

Ref No.	Question	Answer
1	Securing ecological sustainable development and use of natural resources	
1.1	How were the ecological integrity considerations taken into account 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.	It must be noted that the need for all of the specialist studies that have been indicated below and that are discussed in this section, are dependent on the outcome of the Rock Engineering Report and this will be confirmed during the EIA phase of the project. The following specialist studies are proposed to be conducted in support of this application: • Air Quality and Climate Change Impact Study; • Wetland Study; • Heritage and Palaeontology; • Hydrogeology; • Hydrology; • Noise Study; • Ecology; • Social Impact Study; • Soils, Land Use and Capability / Agricultural Impact Study; • Visual Impact Assessment; • Blasting and Vibrations Study; and Closure Plan and Quantum UpdateThe 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 Gert Sibande District Municipal SDF will also be further considered in the EIA and EMPR.
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?	Refer to baseline ecological information in Section 8, and the impact assessment and mitigation measures in Section 9 of this Scoping Report. These sections will be further expanded in the EIA and EMPR, with the addition of specialist input.

Ref No.	Question	Answer
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 recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Refer to waste generation and disposal in Section 3.2.6 of this Scoping Report. This aspect will be further explored in the EIA and EMPR
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 study will inform the subsequent 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 9.1 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 jeopardise 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	Refer to the impact assessment and mitigation methods in Section 9.1 of this Scoping Report.

Ref No.	Question	Answer
	to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	
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 the international market.
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used?	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. 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 Forzando Mine is already an existing mine and the proposed project will be an extension of the existing mine partially utilising existing infrastructure. Minimal additional / new infrastructure will be required to mine the additional coal and to enhance the quality of the product.
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)?	The current knowledge gaps include: Detailed and site-specific 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 11. 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.

Ref No.	Question	Answer
1.8.2	What is the level of risk associated with the limits of current knowledge?	The level of risk is low as this report represents the preliminary scoping level study whilst the EIA and EMPR will be further informed by the various specialist studies and feedback from the I&AP's (during Scoping review).
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, 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 8.17 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	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.

Ref No.	Question	Answer
	different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	
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:	
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,	The Msukaligwa Local Municipality Integrated Development Plan (IDP) for the period of 2017 – 2018 details an unemployment rate of 22.4%. The Municipality is highly dependent on the neighbouring 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. The proposed mining of the extension into the will extend the Life of Mine (LoM) of Forzando Coal Mine, thus allowing the mine to continue supplying 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.
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.

Ref No.	Question	Answer
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 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.
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 life of mine, 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 expanded on 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 alternative 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-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms of 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 within an approved mining area. The existing land

Ref No.	Question	Answer
		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. The proposed project is not located in an urban area.
2.5.7	Optimise the use of existing resources and infrastructure,	Refer to Section 3 of this Scoping Report.
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. Therefore, the 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

Ref No.	Question	Answer
		contributions to 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 in Section 9 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.
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)?	In terms of the socio-economic impacts, the current knowledge gaps include: While the expected potentially significant impacts have been preliminarily identified as part of this Scoping Process, the impacts on socio-economic 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 negative impacts on socio-economic conditions. In fact, the extended LOM would have a positive impact in terms of employment security for the years to come.
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 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPR.

Ref No.	Question	Answer
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	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.
2.8	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 development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	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.
2.9	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 9 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 9 of this Scoping Report. The mine will be 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 Environmental Impact Assessment Process, the applicant ensures that equitable access has been considered. 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.
2.12	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 9 of this Scoping Report. The EIA and EMPR will specify timeframes within which mitigation measures must be implemented.

Ref No.	Question	Answer
2.13	What measures were taken to:	
2.13.1	Ensure the participation of all interested and affected parties.	Refer to Section 7 of this Scoping Report, describing the public participation process to be undertaken for the proposed project.
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 7 of this Scoping Report, describing the public participation process to be implemented for the proposed project. The advertisement and site notice have been made available in English and Afrikaans to assist in understanding of the project. Public meetings are also planned to be held in the scoping and EIA phases of the project. Efforts will be made at the public meetings to be held to ensure that all participants can participate in a language they are able to understand (English / Afrikaans).
2.13.3	Ensure participation by vulnerable and disadvantaged persons,	
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,	
2.13.5	Ensure openness and transparency, and access to information in terms of the process,	
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,	
2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised 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 7 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.

Ref No.	Question	Answer
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, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Workers are educated on a regular basis as to the environmental and safety 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.
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.	The current workers travel from the local area to the mine and back and as such, this aspect is an existing aspect with no new impacts.
2.16.4	The location of jobs opportunities versus the location of impacts.	It is not anticipated that any new jobs will be created; rather, existing jobs will be maintained for a longer period.
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 at various phases 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 7 of this Scoping Report, describing the public participation process to be implemented for the proposed project, as well Section 9, the impact on any national estate, in the Scoping Report.

Ref No.	Question	Answer
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 9 of the Scoping Report. This aspect will be further explored in the EIA and EMPR.
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?	Forzando Coal Mines (Pty) Ltd 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 *"Guideline Document for the evaluation of Quantum of Closure Related Financial Provision Provided by a Mine"*
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 6, 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 EMPR.
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 9 of this Scoping Report. This aspect will be further explored in the EIA and EMPR.

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/layout/design 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 extend the life of mine; and
- The need to enhance the product through beneficiation (wash plant).

The alternatives are described, and the advantages and disadvantages are presented in this section. 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 (DEAT; 2004). 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, Forzando 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 CONSIDERATION OF PROPERTY

No alternative properties were considered for this mining right application as Forzando currently holds a prospecting right on the proposed Kalabasfontein project area. However, two alternative properties have been identified for the new ventilation shaft, namely Portion 7 and Portion 22 of the farm Uitgedacht 299 IS. More details regarding the preliminary location of the ventilation shaft and on-site sensitivities will be provided in the EIA phase once the EIA phase specialist studies have been completed.

6.1.2 LOCATION, LAYOUT OR DESIGN OF THE ACTIVITY

As can be seen in Figure 12, the hatched light-blue area designated 380 and 381 MR represents the Mining Right under ownership of Forzando South, while the light-green demarcates the proposed mining area (Kalabasfontein) registered as Prospecting Rights 1035 PR and 1170 PR. The exploration work to date forms the basis for the current location selection. Between 2006 and 2017, a total of 88 boreholes have been drilled to date to confirm Resource structure.

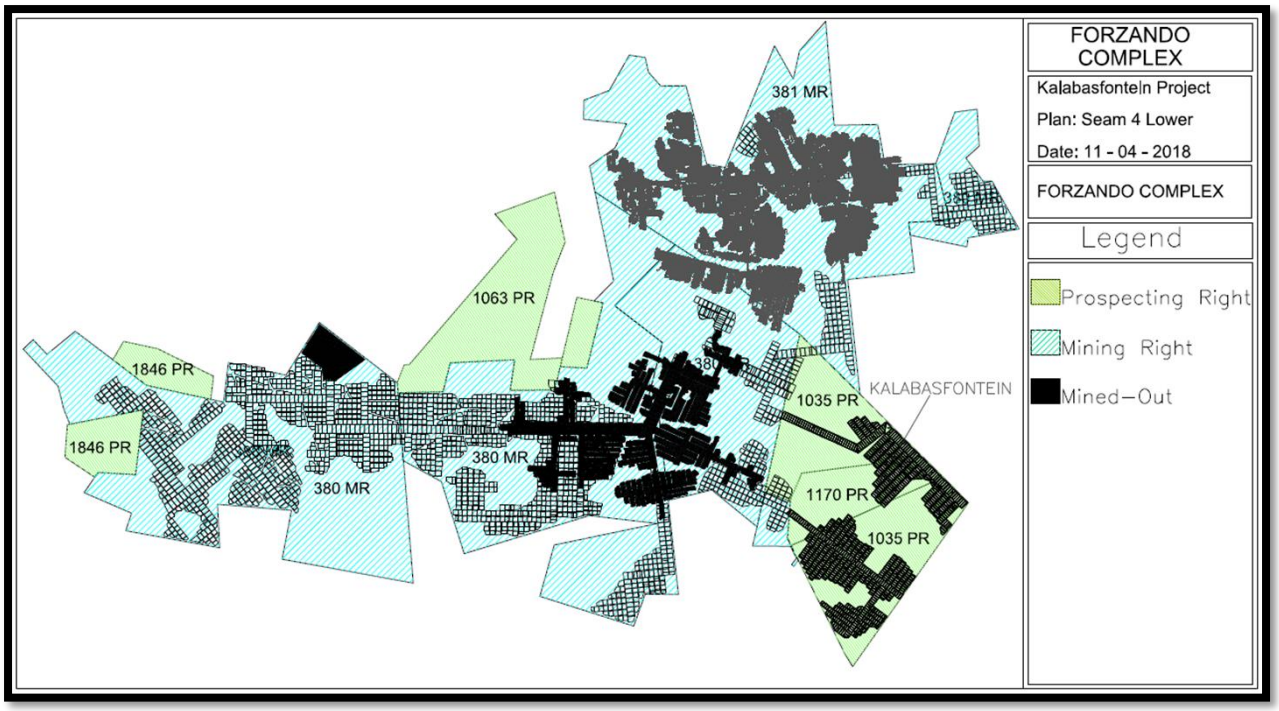

Figure 12: Lower mine design layout

6.2 LAND USE ALTERNATIVES

The land use of the extension area consists predominantly of agricultural land (grazing and crop land) which is adjacent to the current mining and related activities. Forzando currently holds a prospecting right over the proposed extension area and therefore, there is a practical development alternative for the future 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.

6.2.1 MINING

Mining is one of the predominant land uses within the surrounding area. Several active mines, predominantly coal mines, are located within 60 km of the project area and include Taaiboschspruit, Old Leiden, Kusipong, Saymore, Mooiplaats, Ferreira and Penumbra. The mining operations located in the surrounding area can be categorised as open cast and underground operations with surface access nodes. Additional supporting infrastructure is also present and includes mineral processing plants, slurry and co-disposal facilities, conveyor routes, haul roads, offices, pipelines and powerlines. Furthermore, the proposed application area has been impacted by historic and recent prospecting operations. The exploration work to date forms the basis for the current evaluation. Between 2006 and 2017, a total of 88 boreholes have been drilled. Boreholes drilled in 2017 were captured into the database and used to inform a potential access corridor that extends from Forzando South's Central Block East into the northern portion of Kalabasfontein. The Kalabasfontein project will allow for the optimum mining and usage of mineral resources which still remain within the project area and supply of coal to the international markets. As such, mining can be considered a feasible land use alternative within both the application area and surrounding area.

6.2.2 AGRICULTURE

Agriculture is one of the dominant land uses within the surrounding area, comprising mostly monocultures of maize and other small-scale subsistence farming practises. The preliminary desktop analysis of the Soils, Land Use and Land Capability identified soils on site that are not ideally suited to arable agriculture, however, vast areas are being utilized for dryland crop cultivation (crops such as maize, sunflowers and beans). Apple farming in the area between Breyten and Hendrina is on the increase due to suitable climatic conditions. Although agriculture (and forestry) dominates the physical landscape in Msukaligwa Local Municipality, its contribution

to the local economy is relatively small because the product is exported from the area almost entirely in an unbeneficiated form. As such, agricultural potential, based exclusively on soils, indicates that agriculture is a potential feasible alternative. It is also important to note that the agricultural potential of the soils can be returned to conditions suitable for cultivation and grazing so long as basic fertilisation and liming is undertaken, but only at considerable time and cost. As such, agriculture is not considered to be a feasible land use alternative within the application area and will therefore not be considered and assessed further in the EIA Phase.

6.2.3 MIXED LAND USE (MINING AND AGRICULTURE)

Mining and agriculture have been identified as the predominant land uses within the immediate and surrounding area. The character of the application area confirms this finding, with agriculture being the dominant land use on site and historic mining also having been undertaken by Forzando Coal Mine (Pty) Ltd. As a land use, mining is often viewed as directly competing and eventually replacing existing land uses. However, the nature of the proposed Kalabasfontein project (underground) provides an opportunity in which both feasible land uses, namely agriculture and mining can potentially be conducted concurrently. The proposed Kalabasfontein project already has existing access into the mine and the underground coal seams will be extracted at a depth of 22.18m - 127.23m. Due to the existing infrastructure on Forzando South and with the vast majority of mining taking place deep underground, relatively little surface disturbance is expected to take place which will allow for the potential continuation of agriculture as a land use while mining activities are underway. Furthermore, due to the expected depth of mining the risk of subsidence is also greatly reduced as it is anticipated that 22m range will be a very small percentage of the range. The surface area required for mine infrastructure is also greatly reduced as there will be no mineral processing facilities or Tailings Dam on the site. The practicalities of undertaking two concurrent, demanding land uses such as agriculture and mining are likely to require detailed management of operations to ensure the feasibility of both land uses, but it is potentially possible. As such, a mixed land use of mining and forestry can be considered a feasible land use alternative within both the application area and, possibly, the surrounding area.

6.2.4 GRAZING

Livestock grazing is one of the most common and widespread land uses occurring within the immediate and surrounding area of the Kalabasfontein project. Small scale livestock (cattle) grazing occurs on site but is limited due to the availability of land that can be effectively used for livestock. As such, livestock grazing is not considered a feasible land use alternative within the application area and will, therefore, not be considered and assessed further in the EIA Phase.

6.2.5 TOURISM

The proposed Kalabasfontein project area is located approximately 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel), which is dominated by guesthouses used by tourists on route to destinations such as Sodwana. No tourist attractions are located in close proximity to the mining area. The prevalent agriculture and mining character of the area, as well as the low tourism potential and development in the area, limit the probability of tourism development and success in the immediate and surrounding area. As a result, tourism is not considered a feasible land use alternative within the application area and will therefore not be considered and assessed further in the EIA Phase.

6.2.6 RESIDENTIAL

The nearest towns to the proposed mining operation are Hendrina and Bethal, both towns service a community, which is rural in character with farming as the main economic activity. Residential development is not suited to the proposed extension area of Forzando, due to the existing mining activities, and the distance from town. As a result, residential development is not considered a feasible land use alternative within the application area and will therefore not be considered and assessed further in the EIA Phase.

6.3 DETAILS OF MINING METHOD ALTERNATIVES

Longwall mining and bord-and-pillar mining are two of the basic methods of mining coal underground and both methods are well suited to extracting the relatively flat coalbeds (or coal seams). These two mining methods have been considered and assessed for the underground mining at the Kalabasfontein project.

6.3.1 LONG WALL MINING

In the longwall mining method, mine development is carried out in such a manner that large blocks of coal, usually 100 to 300 metres wide and 1,000 to 3,000 metres long, are available for complete extraction. A block of coal is extracted in slices, the dimensions of which are fixed by the height of coal extracted, the width of the longwall face, and the thickness of the slice (ranging from 0.6 to 1.2 metres). In manual or semi-mechanized operations, the coal is undercut along the width of the panel to the depth of the intended slice. It is then drilled and blasted, and the broken coal is loaded onto a conveyor at the face. The sequence of operations continues with support of the roof at the face and shifting of the conveyor forward. The cycle of cutting, drilling, blasting, loading, roof supporting, and conveyor shifting is repeated until the entire block is mined out. Due to the high capital cost and its suitability for much deeper coal fields, longwall mining will not be considered and assessed further in the EIA Phase.

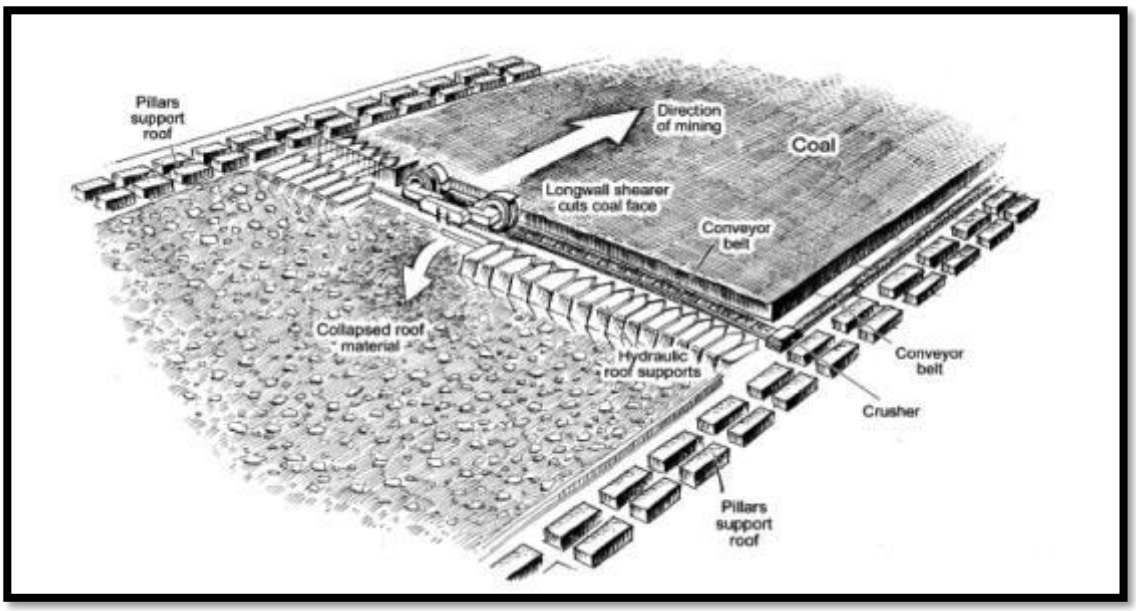

Figure 13: Illustration of long wall mining

6.3.2 BORD AND PILLAR MINING

Also referred to as room and pillar mining, this method is a mining system in which the mined material is taken out across a horizontal plane while leaving "pillars" of unscathed material to support the overstrain leaving open regions or "rooms" underground. The key to bord and pillar mining is optimising the pillar size. If the pillars are too small the mine will fall down. If the pillars are too big then significant quantities of valuable material will be left behind reducing the profitability of the mine. Bord and pillar mines are developed on a grid basis apart from where geological traits such as faults require the basic template to be customized. The optimum pillar size is determined by a calculation based on the weight bearing capability of the material above and below the coal seam and the strength of the coal itself.

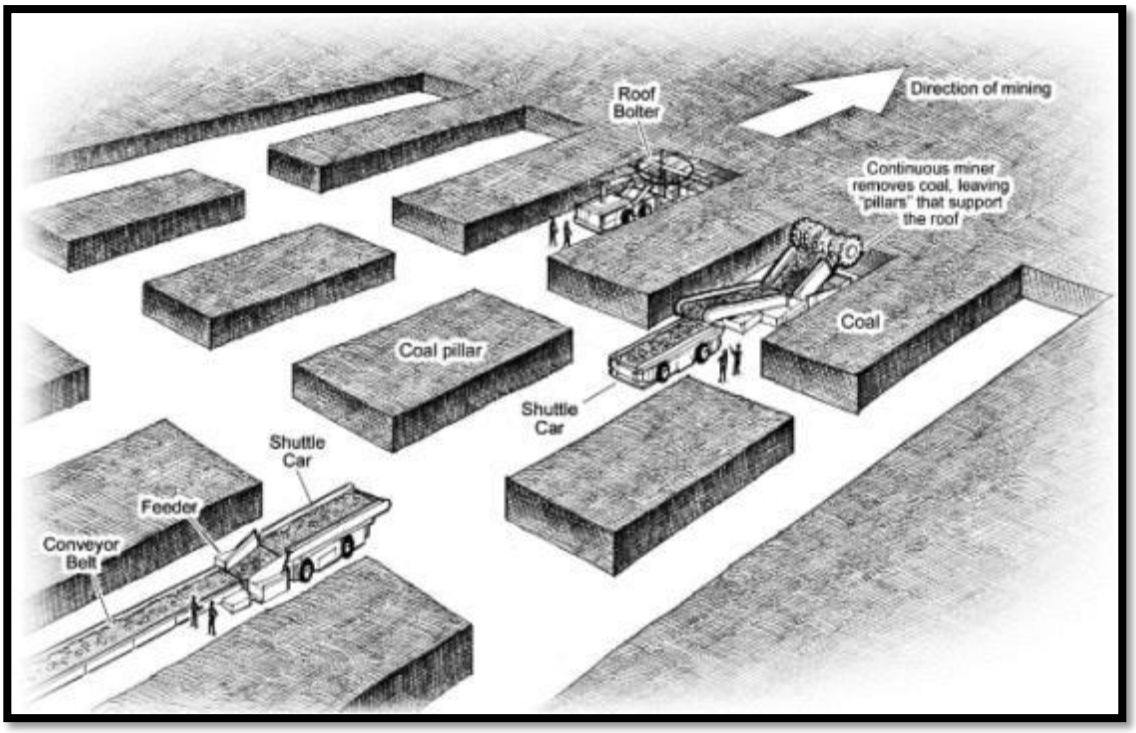

Figure 14: Illustration of bord and pillar mining

6.4 DETAILS OF TECHNOLOGY ALTERNATIVES

The subsections below describe the technological alternatives considered in this Scoping Report.

6.4.1 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.

The Forzando Mining operations currently uses both technology alternatives.

6.4.2 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.
- **Technology Alternative T2a** – *Rail:* This option would involve transport of the coal by rail utilizing a railway siding.
- **Technology Alternative T2a -** *Use of conveyor:* This option would involve transport of the coal by conveyor to the buyer. There is an existing coal conveyor network within close proximity to the mine. This is the alternative currently used to transport the coal.

6.5 DETAILS OF ACTIVITY ALTERNATIVES

The alternatives considered and discussed in the above sections, including land use, location, mining method and site access alternatives have culminated into the identification of three feasible development alternatives. These three feasible development alternatives are discussed below and will be assessed, in detail during the EIA Phase.

6.5.1 ALTERNATIVE 1: NO GO ALTERNATIVE

This alternative will imply that no development takes place and that the environment remains unchanged and unaltered. The proposed development site for the Kalabasfontein project area comprises a mixture of “undisturbed” natural vegetation and land used for cultivation. It is worth noting that other than the isolated wetland and grassland areas, the proposed project area is located in areas dominated by agriculture with consequently low overall biodiversity. If the development should not take place, no additional socio-economic benefits will be created by mining activities in the area, the mineral resource will be lost, and the additional GDP from the coal export will be compromised. Further implications of the No-Go alternative include the loss of economic input into the area and a loss of regional socio-economic benefit.

6.5.2 ALTERNATIVE 2: MAXIMUM MINE PRODUCTION

In this alternative, the mining and production of coal is emphasised and mining is considered to have replaced the dominant agriculture land use. Less restrictive mitigation measures will be used to protect the environmental features, thus allowing for maximum coal production and promotion of economic aspects. This approach will increase the financial viability of the proposed Kalabasfontein project at the potential cost of impacting more severely on environmental features. This alternative is likely to impact more on aspects such as hydrology, air

quality and the isolated pockets of biodiversity, as mining operations will likely move through these sensitive environmental features.

6.5.3 ALTERNATIVE 3: SENSITIVITY PLANNING APPROACH

This alternative will emphasise resource protection and use stringent mitigation measures to minimise identified adverse impacts. This alternative will use specialist planning and evaluation of the following in order to avoid impacting on consolidated sensitive environmental features:

- Mining footprint;
- Mining methodology (Long Wall Mining vs Bord and Pillar Mining);
- Pipeline placement;
- Pollution control dam and return water dam placement;
- Bulk water supply requirements;
- Transport; and
- General infrastructure requirements.

This alternative will allow for the proposed development of the Kalabasfontein project whilst protecting identified consolidated sensitive environmental features as indicated in the consolidated sensitivity map. The concept of *in-sit*u conservation and biodiversity off-sets to account for significant residual impacts may also be explored. In addition, this alternative will consider the continuation of agricultural activities (grazing and cultivation) on the surface and use the consolidated sensitivity map to assist in the design, layout, and planning of the proposed Kalabasfontein project.

6.6 ALTERNATIVE ASSESSMENT

This section describes the pros and cons of various alternatives described above. The findings are presented here in. The table also notes which alternatives are to be taken forward for consideration in the EIA report.

Table 15: Summary of advantages and disadvantages of alternative land uses

Feasible Land Use Alternative	Advantages	Disadvantages
Mining	• A commercial mining operation with a sustainable life of mine; • Provision of sustainable employment and employment retention; • On-going economic input into the immediate and surrounding area; • Improvement of existing infrastructure; • Local economic development through the implementation of the SLP; • Economic injection into the region in terms of small business enterprise development; • On-going supply of both export quality coal and coal for the domestic South African market.	• Numerous potential significant negative social and environmental impacts; • Limited (17 years) duration of socio-economic benefits; • Additional water use requirements; • Rezoning of land required; • Changes to existing land use and land character; • Long-term environmental liability; and • Residual/latent environmental impacts that requiring management and monitoring post mining;
Mixed (Agriculture & Mining)	• A commercial mining operation with a sustainable life of mine; • Provision of sustainable employment and employment retention;	• Potentially compounded significant negative social and environmental impacts; • Increased water use requirements; • Rezoning of sections of land required;

Feasible Land Use Alternative	Advantages	Disadvantages
	• On-going economic input into the immediate and surrounding area; • Improvement of existing infrastructure; • Local economic development through the implementation of the SLP; • Economic injection into the region in terms of small business enterprise development; • On-going supply of both export quality coal; • Continuation of agriculture and associated based economic benefits; • Reduced disruption of existing land use; • Reduced disruption of landscape character; and • Better, more effective use of land	• Long-term environmental liability; and • Residual/latent environmental impacts that requiring management and monitoring post mining;

Table 16: Summary of advantages and disadvantages of underground mining alternatives

Mining Method Alternative	Advantages	Disadvantages
Long Wall Mining	• High Efficiency; • Higher coal recovery; • Fewer workers required; • Safety improved through better roof control and a reduction in the use of moving equipment; • Minimizes the need for dusting mine passages with inert material to prevent coal dust explosions. • Involves no blasting (safer); • Coal haulage system is simpler; • Ventilation is better controlled; • Subsidence of the surface is more predictable; • Overall offers more opportunities for automation; and • Well suited to deep coalbeds. Suitable for coalbeds deeper than 1000 feet.	• Numerous potential significant negative social and environmental impacts; • Limited (17 years) duration of socio-economic benefits; • Additional water use requirements; • Rezoning of land required; • Changes to existing land use and land character; • Long-term environmental liability; and • Residual/latent environmental impacts that requiring management and monitoring post mining;

Mining Method Alternative	Advantages	Disadvantages
Bord and Pillar Mining	• Fast, simple, and requires very little equipment; • Relatively low capital cost; • Coal production can start much more quickly, which equals faster return on investment.	• Limited socio-economic benefits; • Sterilization of the mineral resource; and • Loss of potential economic injection into the region.

6.7 MOST APPROPRIATE DEVELOPMENT ALTERNATIVE GOING FORWARD

The most appropriate development alternative going forward is considered to be Alternative 3: Sensitivity Planning Approach which utilises the Consolidated Sensitivity Map generated (see Figure 15) with both specialist and EIMS input as a planning tool. The preliminary sensitivity map is based on a desktop assessment and may be updated with specialist input during the EIA phase. The current sensitivity was determined using the location of sensitive habitats and features such as wetlands, rivers and important bird areas as per the methodology described in Section 12. The sensitivity planning approach is also likely to have further implications in terms of mine design as well as economic viability of the proposed project, all of which will be evaluated in the EIA investigation. Regardless, all three feasible development alternatives described above will also be comparatively assessed and evaluated during the EIA Phase to determine the most appropriate alternative going forward.

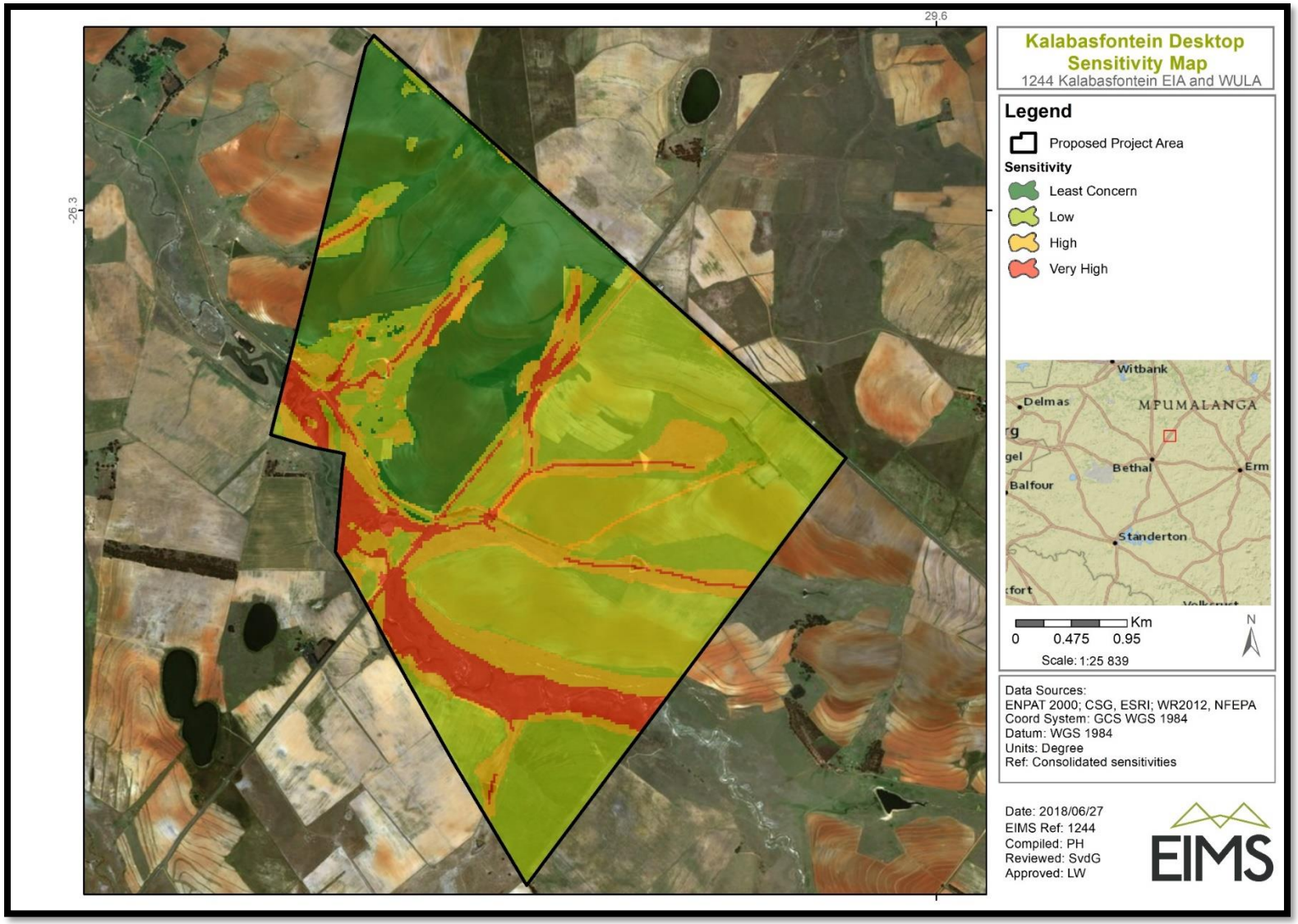

Figure 15: Preliminary sensitivity map

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 comments are considered and a record included in the reports submitted to the 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 to ensure and promote:

- Compliance with international best practice options;
- Compliance with national legislation;
- Establishment and management of relationships with key stakeholder groups; and
- Involvement and participation in the environmental study and authorisation/approval process.

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

- Introduce the proposed project;
- Explain the authorisations required;
- Explain the environmental studies already completed and yet to be undertaken (where applicable);
- Solicit and record any issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&APs and the project team;
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximize and/or promote positive environmental impacts associated with the project.

7.1 GENERAL APPROACH TO SCOPING AND PUBLIC PARTICIPATION

The PPP for the proposed project has been undertaken in accordance with the requirements of the MPRDA and NEMA EIA Regulations (2014), and 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 and have their views considered and included as part of project planning.

An initial I&AP database has been compiled based on known key I&AP's, Windeed searches and stakeholder databases provided by the mine. The I&AP database includes amongst others landowners, communities, regulatory authorities and other specialist interest groups.

7.1.1 LIST OF ORGANS OF STATE/ AUTHORITIES IDENTIFIED AND NOTIFIED

The following, but not limited to, 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 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
- Gert Sibande District Municipality
- South African National Roads Agency Limited (SANRAL)
- Eskom Holdings SOC Limited
- Transnet SOC Limited
- Msukaligwa Local Municipality

7.1.2 OTHER KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

- Birdlife South Africa
- Wildlife & Environmental Society of South Africa (WESSA)
- AFGRI
- Agri SA Mpumalanga
- Federation for a Sustainable Environment
- South African National Biodiversity Institute (SANBI)
- Homeland Mining & Energy SA (HMESA)
- Endangered Wildlife Trust

7.1.3 INITIAL NOTIFICATION (NOTICES, ADVERTISEMENTS, AND BID)

The PPP commenced on 20 June 2018 with an initial notification and call to register for a period of 30 days, ending on the 20 July 2018. These initial notifications were given in the following manner:

7.1.3.1 REGISTERED LETTERS, FAXES AND EMAILS

Notification letters (English and Afrikaans), faxes, and emails were distributed to all pre-identified key I&APs including government organisations, NGOs, relevant municipalities, ward councillors, landowners and other organisations that might be affected.

The notification letters included the following information to I&APs:

- List of anticipated activities to be authorised;
- Scale and extent of activities to be authorised;
- Information on the intended mining operation to enable I&APs to assess/surmise what impact the activities will have on them or on the use of their land;
- The purpose of the proposed project;
- Details of the affected properties (including a locality map);
- Details of the relevant MPRDA and NEMA Regulations;
- Initial registration period timeframes; and
- Contact details of the EAP.

In addition, a registration sheet/ questionnaire was included in the registered letters, emails and facsimiles, towards facilitating registration and soliciting input on local knowledge of the study area.

7.1.4 BACKGROUND INFORMATION DOCUMENT (BID)

A Background Information Document (BID) in English was prepared and distributed by post with the registered letters, faxes and e-mails and made available on the EIMS website (www.eims.co.za). The BID contains the following information:

- Project name;
- Applicant name;
- Project location (including map of study area);
- Description of the EA application process, EIA flow chart, and public participation process;
- Information on future document review opportunities;
- A detailed questionnaire/ I&AP registration form; and
- Relevant EIMS contact person for the project.

7.1.5 NEWSPAPER ADVERTISEMENTS / GOVERNMENT GAZETTE

Advertisements describing the proposed project and EIA process were placed in newspapers with circulation in the vicinity of the study area. The initial advertisements were placed in the Ridge Times (English advert) and the Highvelder (Afrikaans advert) on 22 June 2018. The newspaper adverts included the following information:

- Project name;
- Applicant name;
- Project location;

- Nature of the activity; and
- Relevant EIMS contact person for the project.

7.1.6 SITE NOTICE PLACEMENT

21 A2 Correx site notices were placed at 21 locations along and within the perimeter of the proposed project area during the initial notification. The on-site notices included the following information:

- Project name;
- Applicant name;
- Project location;
- Map of proposed project area;
- Project description;
- Legislative requirements; and
- Relevant EIMS contact person for the project.

7.1.7 POSTER PLACEMENT

A3 posters in English and Afrikaans were placed at 2 local public gathering places in town near the study area (Bethal).

The notices and written notification afforded all pre-identified I&APs the opportunity to register for the project as well as to submit their issues/queries/concerns, and indicate the contact details of any other potential I&APs that should be contacted. The contact person at EIMS, contact number, email and faxes were stated on the posters. Comments/concerns and queries were encouraged to be submitted in either of the following manners:

- Electronically (fax, email);
- Telephonically; and/or
- Written letters.

7.2 AVAILABILITY OF DRAFT SCOPING REPORT NOTIFICATION

Notification regarding the availability of this Scoping Report for public review has been given in the following manner to all registered I&APs (which includes key stakeholders and landowners):

- Registered letters with details on where the Scoping Report is available from, as well as the public review comment period;
- Facsimile notifications with information similar to that in the registered letter described above; and/or
- Email notifications with a letter attachment containing the information described above.

The Scoping Report has been made available for public review from 10 July 2018 until 10 August 2018 for a period of 30 days. In order to present the findings of the Scoping Report to the public and to solicit comments on the report, a public meeting was held on the 25th July 2018 at the Bethal Public Library (Danie Nortje Street, Contact: Bettie Jordan on 017 624 3029) from 13h00 to 15h00.

7.3 PUBLIC PARTICIPATION

Comments raised will be addressed in a transparent manner and included in the Public Participation Report (Appendix 2). The main comments to date are with respect to the following:

- I&AP registration,
- Eskom requirements when working within the servitude;

- SAHRA's response to initial notification advising of requirement to create a case on SAHRIS;
- The impact of the project on agriculture; and
- Job availability.

8 ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section of the Scoping Report provides a description of the environment that may be affected by the proposed 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. This information has been sourced from existing information available for the area as well as previous specialist reports undertaken for the Kalabasfontein project.

8.1 LOCATION

Kalabasfontein project area is situated in Mpumalanga, 20 kilometres north of Bethal and 20 kilometres east of Ga-Nala (Kriel). It is located to the east and south of the existing Forzando South 380MR and Forzando North 381MR respectively which fall within the Msukaligwa Local Municipality within Gert Sibande District Municipality. The project area comprises two prospecting rights, 1035PR & 1170PR, which covers a total of 1 547.8296ha over portions 7, 8, RE, 11 and 13 of the farm Kalabasfontein 232 IS (Figure 1). The required ventilation shaft is to be located on either on portion 7 or portion 22 of the farm Uitgedacht 229 IS.

Forzando Coal Mines (Pty) Ltd. applied to the DMR for the conversion of Old Order Mining Rights to New Order Mining Rights for its mining operations at the Forzando North Shaft and Forzando South Shaft. These conversions were granted in November 2011 and executed on 28 June 2013. This application is for the extension of the current mining areas (under Section 102 of Act No.28 of 2002) by inclusion of contiguous areas which are held under Prospecting Rights 1035PR & 1170PR. Through an intensive drilling exercise on these areas, economically viable blocks of coal have been defined. The plan is to access these newly defined blocks of coal from the existing Forzando South incline.

8.2 TOPOGRAPHY AND SURFACE HYDROLOGY

The gently undulating highland topography is typical of the central Mpumalanga province, with fairly broad to narrowly incised valleys of headwater drainages. There are a number of marshy areas or vleis in the upper parts of the valleys and numerous pans, which vary from insignificant vegetated depressions to large deeply etched features with bare clayey floors. An ecologically important concentration of pans and freshwater lakes is located in the Chrissiesmeer area.

The municipality is roughly dissected by the (continental) divide between the Upper Vaal and Usuthu / Pongola Water Management Areas. In the north of the Municpality, certain sub-catchments drain into the Olifants and Inkomati WMA's. The headwaters of the Vaal River are found in the western half of the municipality and drain in a southwesterly direction along with the Tweefontein River.

The Usuthu River rises in the northeast of the municipality. The headwaters of the Inkomati River flow northwards from the municipality into the Inkomati WMA, and the headwaters of the Olifants and Klein-Olifants River drain the far northwest of the municipality (Msukaligwa Local Municipality 2010).

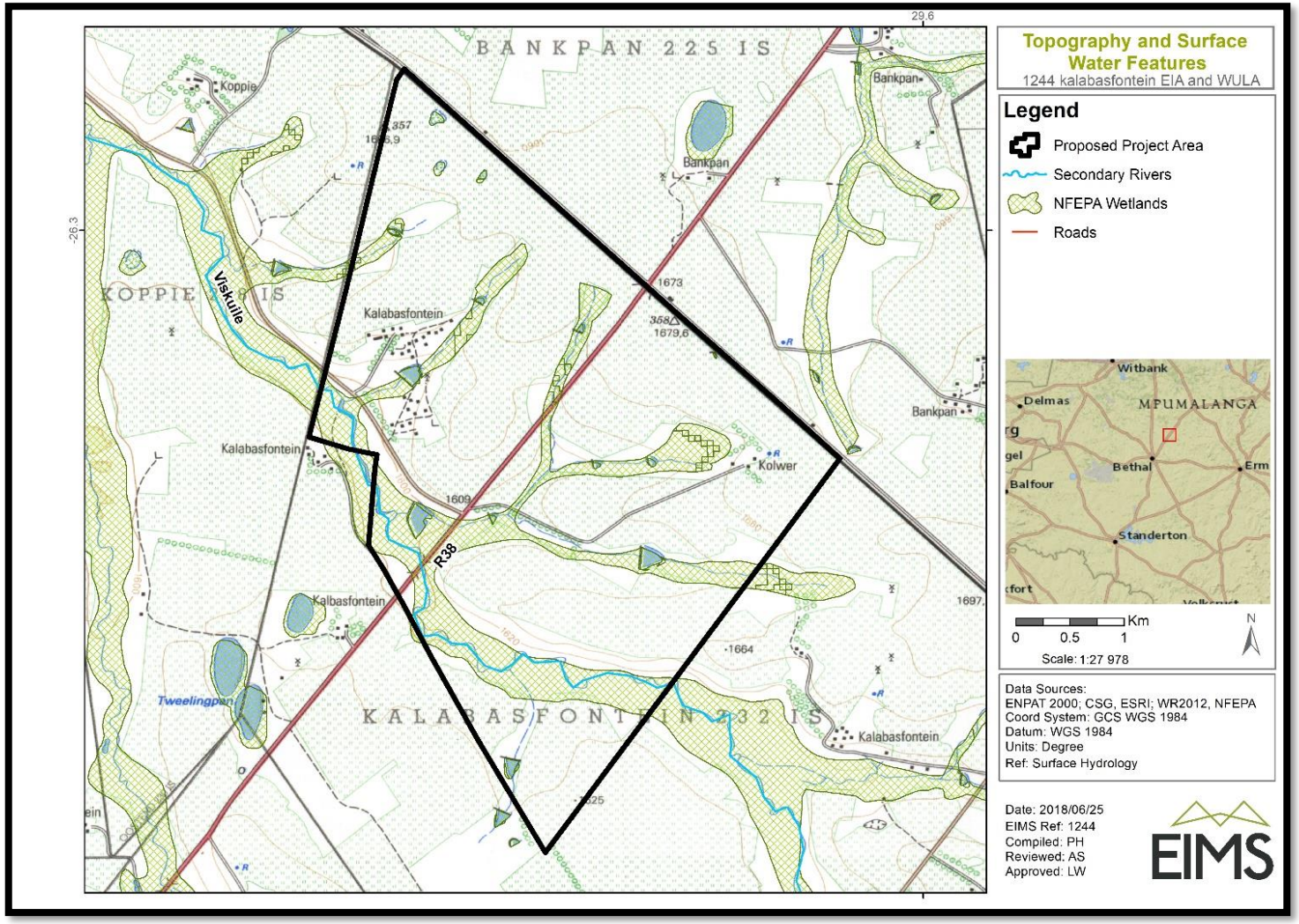

Figure 16: Topography and surface hydrology

8.3 GEOLOGY AND SOILS

Kalabasfontein project area extends to the south-east of the Forzando Complex which is situated in the north-eastern corner of the Highveld Coalfield where the pre-Karoo Smithfield Ridge separates the area from the Witbank Coalfield to the north (see Figure 17 and Figure 18). To the east, stratigraphic and sedimentological changes mark the transition from the Highveld Coalfield to the Ermelo Coalfield. Basement rock in the area comprise Rooiberg felsites and granites of the Bushveld Lebowa Suits, which are often palaeo-weathered to a depth of several metres.
During the Permo-Carboniferous times, erosion by continental ice-sheets shaped the pre-Karoo palaeo-topography resulting in a glaciated relief consisting of elongated low ridges and shallow valleys that have influenced the depositional patterns of sequences that followed. Noticeably, thickness of the coal seams generally correlates with the original glaciated valleys.

Dwyka Formation is characterized by sediments of glacial origin such as tillites, diamictites and varvites. Vryheid formation comprises a predominantly arenaceous sequence of sandstone and conglomerates with subordinate siltstones and coal seams. Vryheid Formation comprises a series of five upward-coarsening depositional sequences of siltstone and sandstone, each capped by a coal seam or seam package (Forzando Coal Mines (Pty) Ltd. 2018).

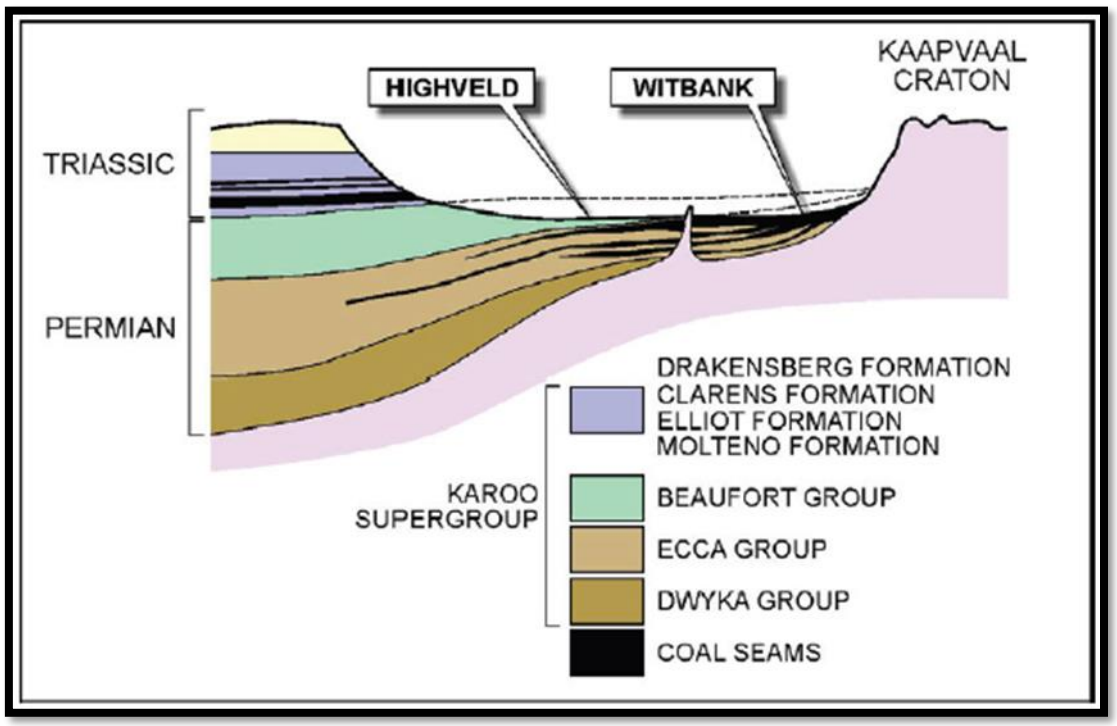

Figure 17: Schematic representation of coal deposition in South Africa

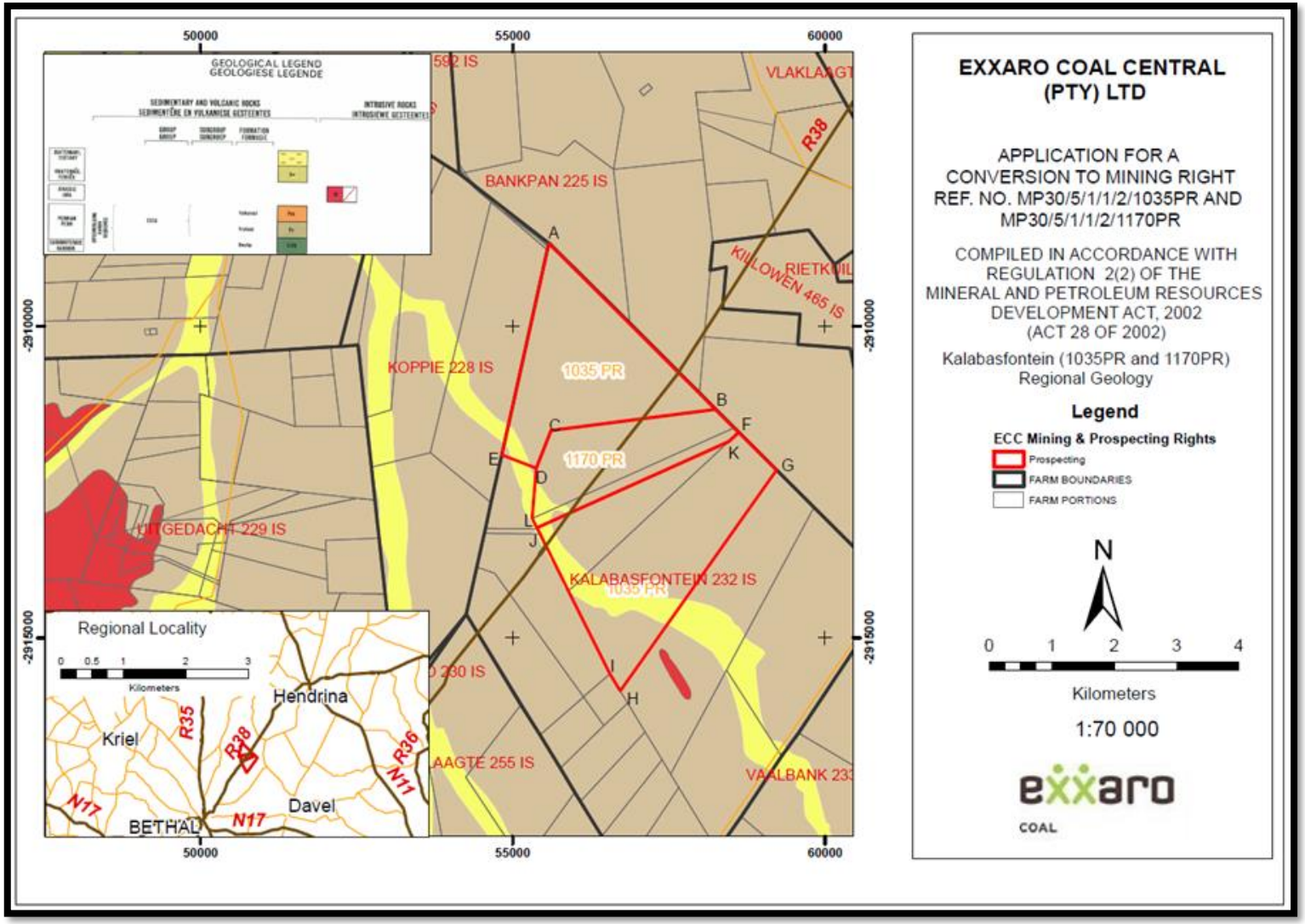

Figure 18: Regional geological map.

8.4 CLIMATE

The climate is typical Highveld with a mean annual rainfall of between 600 and 800 mm. Average maximum temperature ranges between 25°C and 29°C and the mean minimal temperature between -1.9°C and 2.0°C. It is also stated in the IDP (2017) that, global climate change will impact upon the province, specifically on agriculture, water resources, biodiversity, forestry and human health. Nearly 9% of the province's ecosystems are endangered, some critically so. 9% of land in the province is degraded; 35.8% of land has been transformed, primarily within the grassland biome; and 33% of the provincial river types are critically endangered. Hence, responsible and sustainable development, as well as proper environmental management and conservation is paramount.

8.5 SOCIO-ECONOMIC

The following section provides a summary of the social and economic environment that may be influenced by the proposed project. Information in this section was sourced from Stats SA and the Integrated Development Plans (IDP's) for the Msukaligwa Local Municipality as well as the Gert Sibande District Municipality. The information provided in the IDP's and the Stats SA website are based on a 2011 National census and well as the 2016 Community Survey[1].

According to the National Environmental Management Act (NEMA, 1998) environment refers to the surroundings in which humans exist. When viewing the environment from a socio-economic perspective the question can be asked what exactly the social environment is. Different definitions for social environment exist, but a clear and comprehensive definition that is widely accepted remains elusive. Barnett & Casper (2001) offers the following definition of human social environment:

> *"Human social environments encompass the immediate physical surroundings, social relationships, and cultural milieus within which defined groups of people function and interact. Components of the social environment include built infrastructure; industrial and occupational structure; labour markets; social and economic processes; wealth; social, human, and health services; power relations; government; race relations; social inequality; cultural practices; the arts; religious institutions and practices; and beliefs about place and community. The social environment subsumes many aspects of the physical environment, given that contemporary landscapes, water resources, and other natural resources have been at least partially configured by human social processes. Embedded within contemporary social environments are historical social and power relations that have become institutionalized over time. Social environments can be experienced at multiple scales, often simultaneously, including households, kin networks, neighbourhoods, towns and cities, and regions. Social environments are dynamic and change over time as the result of both internal and external forces. There are relationships of dependency among the social environments of different local areas, because these areas are connected through larger regional, national, and international social and economic processes and power relations."*

The environment influences and constrains behaviour, but behaviour also leads to changes in the environment. The impacts of a project on people can only be truly understood if their environmental context is understood. The baseline description of the social environment will include a description of the area within a provincial, district and local context that will focus on the identity and history of the area as well as a description of the population of the area based on a number of demographic, social and economic variables. Table 17, presents a summary of the socio-economic aspects which may have a bearing on the proposed project.

Table 17: Summary of the socio-economic aspects (Msukaligwa Local Municipality 2017)

Aspect	Local Municipality
District Municipality	Gert Sibande District Municipality
Province	Mpumalanga Province

[1] It is acknowledged that this data may be outdated as no more recent census has been undertaken (Stats SA) and in addition, the municipal IDP 2017-2022 is still in draft mode and may be updated after review.

<table>
<tr><td>Municipal Area Size</td><td>6016 km^2</td></tr>
<tr><td>Number of Wards</td><td>19 wards</td></tr>
<tr><td>Population Size</td><td>164 608</td></tr>
<tr><td>Number of households</td><td>51 809</td></tr>
<tr><td>Estimated growth/change in population size from 2001</td><td>~31.9%</td></tr>
<tr><td>Population composition</td><td>Black African (91.7%), White (6.7%), Colored (0.6%), Indian or Asian (0.9%)</td></tr>
<tr><td>Languages</td><td>Main languages spoken are isiZulu, Afrikaans, SiSwati and English</td></tr>
<tr><td>Age</td><td>Age group 0 – 14 comprising 28% of the total population and 15 – 34 comprising of 41%, while 26% is between 35 and 64 years and 5% is 65 years and above</td></tr>
<tr><td>Gender</td><td>50.39% female, 49.61% male</td></tr>
<tr><td>Education</td><td>
<table>
<tr><td>Education Indicators</td><td>2001</td><td>2011</td></tr>
<tr><td>Number of people 15+ with no schooling</td><td>18 125</td><td>12 213</td></tr>
<tr><td>% Population 15+ with no schooling</td><td>21.7%</td><td>8.2%</td></tr>
<tr><td>% Population 15+ with matric and post matric qualification (%)</td><td>20.5%</td><td>23.6%</td></tr>
<tr><td>% Functional Literacy rate (%)</td><td>58.1%</td><td>51.4%</td></tr>
</table>
</td></tr>
<tr><td>Land use</td><td></td></tr>
<tr><td>Housing</td><td>The predominant settlement type is a house or brick structure on a sepatate stand, followed by traditional dwelling/hut structure, flats, townhouse, backyard room or hose then informal settlements. Overall, it is estimated that the housing is 75% formal and 26% informal dwelling type.</td></tr>
<tr><td>Urban development</td><td>According to the SDF as well as previous plans of the municipality, the area South to South West of Ermelo town between and along the N11 and R36 roads is a land earmarked for future urban development. Also East of Ermelo town along the N2 Piet Retief Road the area is earmarked for urban housing development.

Currently there are number of vacant stands for residential and business development besides the proposed land for future development.

Wesselton as a dormitory township for Ermelo, there is also land earmarked for future urban development bounded by N11, Hendrina Road on the West. The said land is owned the municipality and a portion further to the East of this land is privately owned.</td></tr>
<tr><td>Energy</td><td>By February 2017, nearly seven million households had been connected to the grid and now have electricity. The successful execution of Eskom’s Build and Maintenance programmes helped to ensure stability and an end to load-shedding. Work is continuing to ensure energy security. Renewable energy forms an important part of the energy mix, which also includes electricity generation from gas, nuclear, solar, wind, hydro and coal. Government is committed to the overall Independent Power Producer Programme and is expanding the programme to other sources of energy, including coal and gas, in</td></tr>
</table>

	addition to renewable energy. Eskom will sign the outstanding power purchase agreements for renewable energy in line with the procured rounds.
Access to water	The municipality had over the past years through the District and in partnership with relevant spheres of government strived to meet the millennium target in ensuring access to water for all by 2015. In striving to achieve this target, the municipality has managed to reduce the water backlog to 9%. Though the 9% reflect as a backlog, these affect communities at the farms/rural areas of the municipality where water has been provided through boreholes but below the RDP level. Provision of clean drinking water (potable water) is almost addressed with few challenges more especially at rural / farmlands within the municipality. In providing Water, the Municipality shall ensure that water is provided to schools, clinics and all other social amenities. It is therefore ensured that prior to approval of construction of clinics and schools there is water provided to such amenities more especially ensuring that farm schools have water where the farm owners cannot provide. The municipality is a water services authority and therefore responsible for supply of water within its area of jurisdiction.
Nearby towns	Breyton, Camden, Davel, Wesselton, Ermelo, Phumula, KwaZanele
Percentage employment	41,698 in 2011
Percentage unemployment	Unemployment rate stood at 26.8% in 2011 which has decreased by 4.4% to 22.4% in 2016
Largest Employing sector	Agricculture
Largest economic contribution	Transport
Tourism	Government has identified tourism as a key job driver. Tourist arrival numbers for January to November 2016 increased to nine million, an increase of just over a million arrivals from 2015. This represents a 13% growth in tourist arrivals

8.6 CULTURAL AND HERITAGE RESOURCES

The topographical map 2629BC, Kalabasfontein revealed no features of significance. However, this will be confirmed by a heritage specialist during the EIA phase of the study. It is anticipated that the following cultural and historical sites and resources could exist on site:

- Burial sites and graves;
- Farmsteads;
- Rock engraving sites; and
- Old structures such as dams, etc.

Due to the fact that the underlying Vryheid Formation sediments and coal beds will only be exposed during the proposed mining operations and associated infrastructure development, it is unlikely that any fossils will be observed before the mining takes place.

8.7 PALAEONTOLOGICAL RESOURCES

As can be seen in Figure 19 below, the proposed Kalabasfontein project area (green polygon) is mostly located in an area of potentialy high palaeontological sesitivity (South African Heritage Resources Agency 2018). The different colours on

the map represent different levels of estimated palaeontological sensitivity. The key below is provided by SHARA to determine sensitivity:

- **RED, VERY HIGH**: field assessment and protocol for finds is required
- **ORANGE/YELLOW**, **HIGH**: desktop study is required and based on the outcome of the desktop study, a field assessment is likely
- **GREEN, MODERATE**: desktop study is required
- **BLUE, LOW**: no palaeontological studies are required however a protocol for finds is required
- **GREY, INSIGNIFICANT/ZERO**: no palaeontological studies are required
- **WHITE/CLEAR, UNKNOWN**: these areas will require a minimum of a desktop study.

A palaeontological impact assessment will therefore be undertaken in the EIA phase of the project.

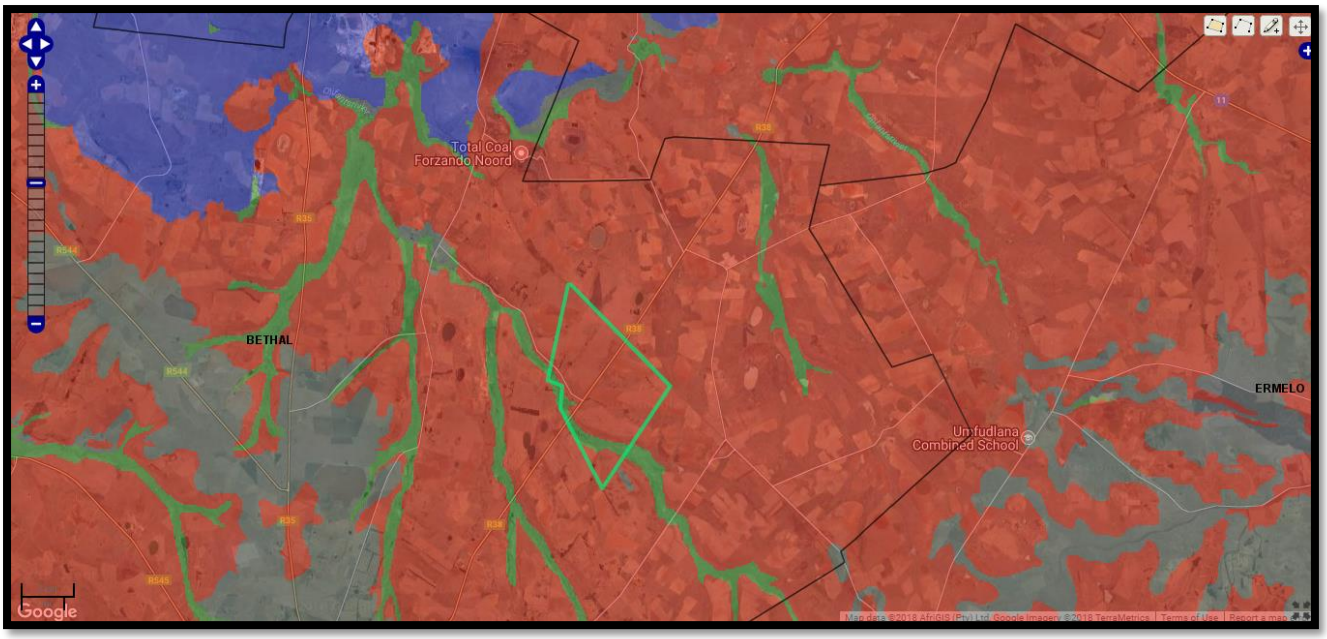

Figure 19: Kalabasfontein proposed project area in relation to palaeontological sensitivity.

8.8 LAND CAPABILITY

Although soils in large parts of the area are not ideally suited to arable agriculture, the portion of land that falls in the project area is classified as arable (Figure 20), vast areas are being utilized for dryland crop cultivation (crops such as maize, sunflowers and beans). Apple farming in the area between Breyten and Hendrina is on the increase due to suitable climatic conditions. No significant beneficiation of agricultural produce occurs within the municipality. Improvements on the commercial farms mostly include the farmsteads (farmer's house, yard, barns, etc.) and labourers compounds. There are no conservation or formal protected areas within the proposed project area and the municipality at large.

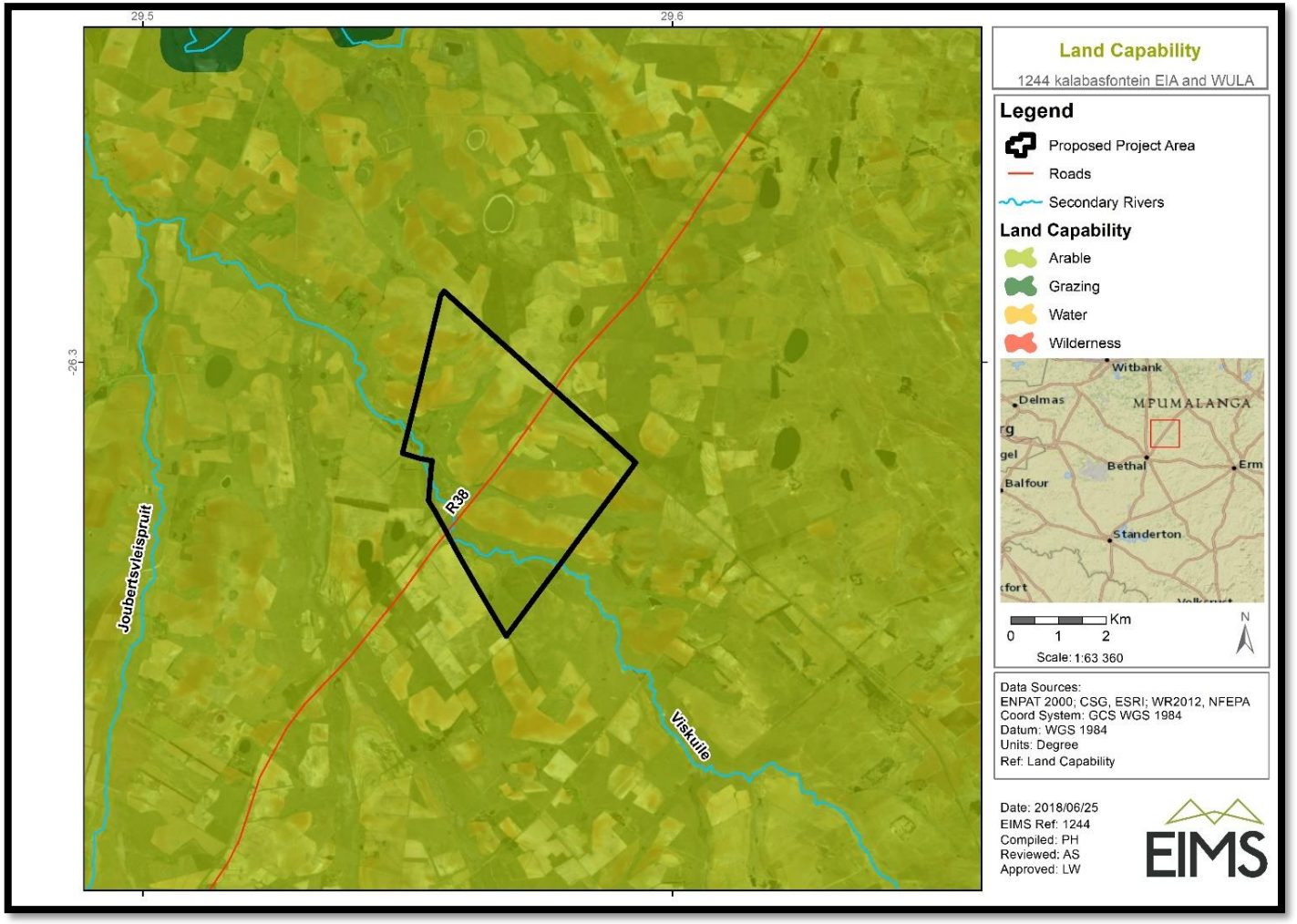

Figure 20: Land capability

8.9 LAND USE / LAND COVER

The majority of rural land in the Msukaligwa municipal area is utilized for commercial agricultural purposes (Figure 21). The grassland areas are used for cattle and sheep grazing. In this regard it should be noted that the Carolina/Bethal/Ermelo triangle which supports an important sheep (and wool) farming sector, is primarily located within the municipality. The areas around the Viskuile River and surrounding wetlands remain natural.

Although soils in large parts of the area are not ideally suited to arable agriculture, vast areas are being utilized for dryland crop cultivation (crops such as maize, sunflowers and beans). Apple farming in the area between Breyten and Hendrina is on the increase due to suitable climatic conditions. No significant beneficiation of agricultural produce occurs within the municipality. Improvements on the commercial farms mostly include the farmsteads (farmer's house, yard, barns, etc.) and labourers compounds. There are no conservation or formal protected areas within the proposed project area and the municipality at large.

While there are some sand and granite quarries in the area, local mining activity is dominated by coal extraction. The Ermelo Coalfield which lies in the western and central parts of the municipality has rich reserves which can be exploited for many years to come. The worldwide economic growth in the first half of the decade, together with the South African electricity crises, stimulated the demand for coal and a large number of mining right applications were lodged in the area during the past few years – it is expected that coal mining activities will increase significantly in the foreseeable future.

Mining methods consist mainly of board-and-pillar underground extraction, with opencast mining in those areas where the coal seams are sufficiently shallow. Mining-related land uses include shafts, equipment stores and workshops, coal washing plants, coal storage areas, waste rock and topsoil dumps, and mining-related infrastructure such as roads, conveyers, rail sidings, etc. These land uses have a significant negative environmental and aesthetic impact (Msukaligwa Local Municipality 2010).

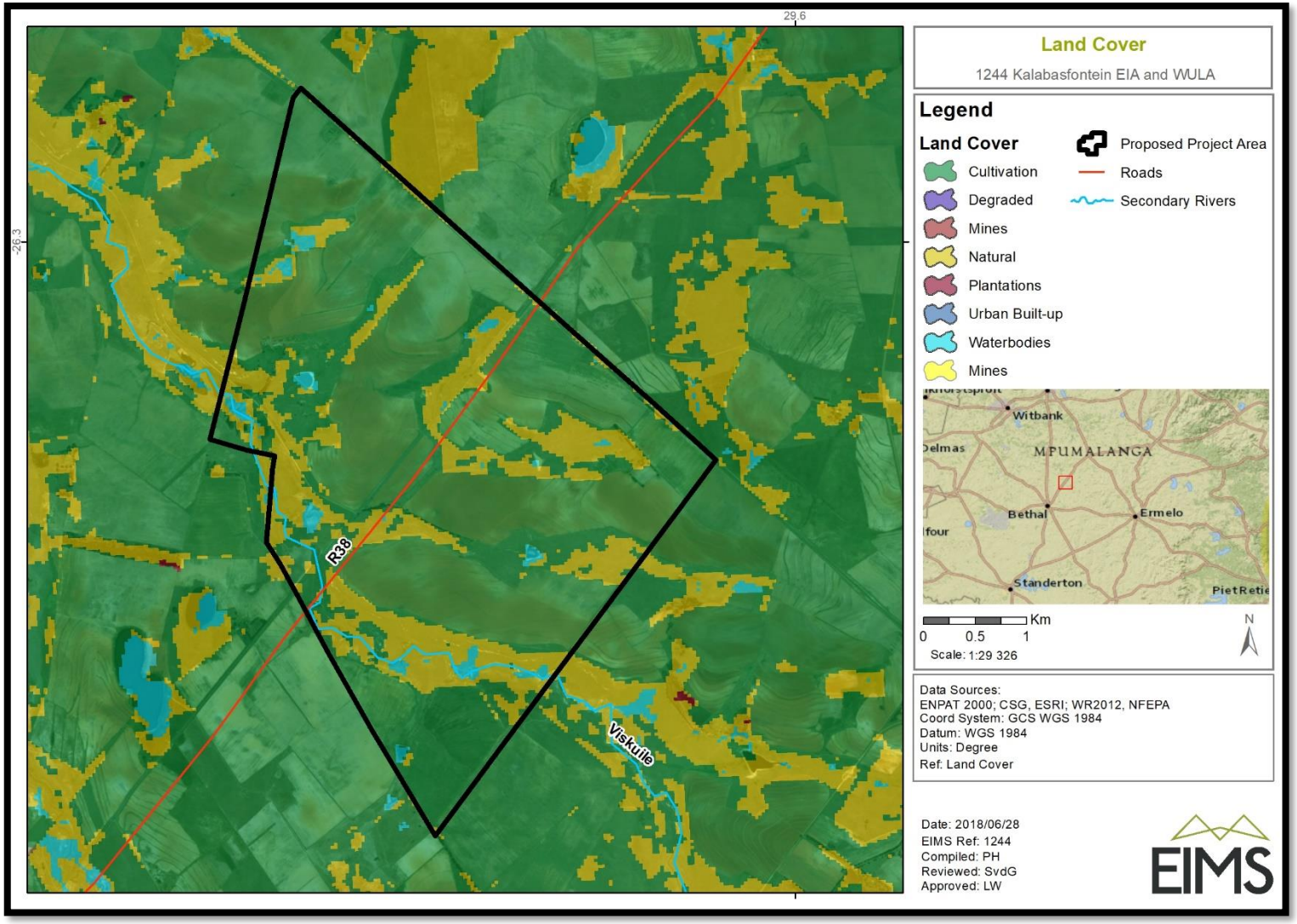

Figure 21: Land use / land cover map

8.10 FLORA

The proposed project area falls with in the Grassland Biome which is the only biome that covers the entire municipality (South African National Biodiversity Insitute 2018). As illustrated in Figure 22, the Kalabasfontein project area consists of mostly disturbed land as a majority of the site is clasified as no natural habitat remaining. Figure 23 shows that underground mining is restricted along the Viskuile River and surrounding wetland habitat. The vegetation type found in the proposed project area is the Eastern Highveld grassland and is further described below.

8.10.1 EASTERN HIGHVELD GRASSLAND

Distribution Mpumalanga and Gauteng Provinces: Plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief. Altitude 1 520–1 780 m, but also as low as 1 300 m.

Vegetation & Landscape Features Slightly to moderately undulating plains, including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lycioides* subsp *lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismontanum*).

Geology & Soils Red to yellow sandy soils of the Ba and Bb land types found on shales and sandstones of the Madzaringwe Formation (Karoo Supergroup). Land types Bb (65%) and Ba (30%).

Climate Strongly seasonal summer rainfall, with very dry winters. MAP 650–900 mm (overall average: 726 mm), MAP relatively uniform across most of this unit, but increases significantly in the extreme southeast. The coefficient of variation in MAP is 25% across most of the unit, but drops to 21% in the east and southeast. Incidence of frost from 13–42 days, but higher at higher elevations.

Important Taxa Graminoids: *Aristida aequiglumis* (d), *A. congesta* (d), *A. junciformis* subsp. *galpinii* (d), *Brachiaria serrata* (d), *Cynodon dactylon* (d), *Digitaria monodactyla* (d), *D. tricholaenoides* (d), *Elionurus muticus* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *E. racemosa* (d), *E. sclerantha* (d), *Heteropogon contortus* (d), *Loudetia simplex* (d), *Microchloa caffra* (d), *Monocymbium ceresiiforme* (d), *Setaria sphacelata* (d), *Sporobolus africanus* (d), *S. pectinatus* (d), *Themeda triandra* (d), *Trachypogon spicatus* (d), *Tristachya leucothrix* (d), *T. rehmannii* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *A. schirensis*, *Bewsia biflora*, *Ctenium concinnum*, *Diheteropogon amplectens*, *Eragrostis capensis*, *E. gummiflua*, *E. patentissima*, *Harpochloa falx*, *Panicum natalense*, *Rendlia altera*, *Schizachyrium sanguineum*, *Setaria nigrirostris*, *Urelytrum agropyroides*. Herbs: *Berkheya setifera* (d), *Haplocarpha scaposa* (d), *Justicia anagalloides* (d), *Pelargonium luridum* (d), *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Euryops gilfillanii, E. transvaalensis* subsp. *setilobus, Helichrysum aureonitens*, *H. caespititium*, *H. callicomum*, *H. oreophilum*, *H. rugulosum*, *Ipomoea crassipes*, *Pentanisia prunelloides* subsp. *latifolia*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata*. Geophytic Herbs: *Gladiolus crassifolius*, *Haemanthus humilis* subsp. *hirsutus*, *Hypoxis rigidula* var. *pilosissima*, *Ledebouria ovatifolia*. Succulent Herb: *Aloe ecklonis*. Low Shrubs: *Anthospermum rigidum* subsp. *pumilum*, *Stoebe plumosa*.

Conservation Endangered. Target 24%. Only very small fraction conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and in private reserves (Holkranse, Kransbank, Morgenstond). Some 44% transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. Cultivation may have had a more extensive impact, indicated by land-cover data. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites. Erosion is very low.

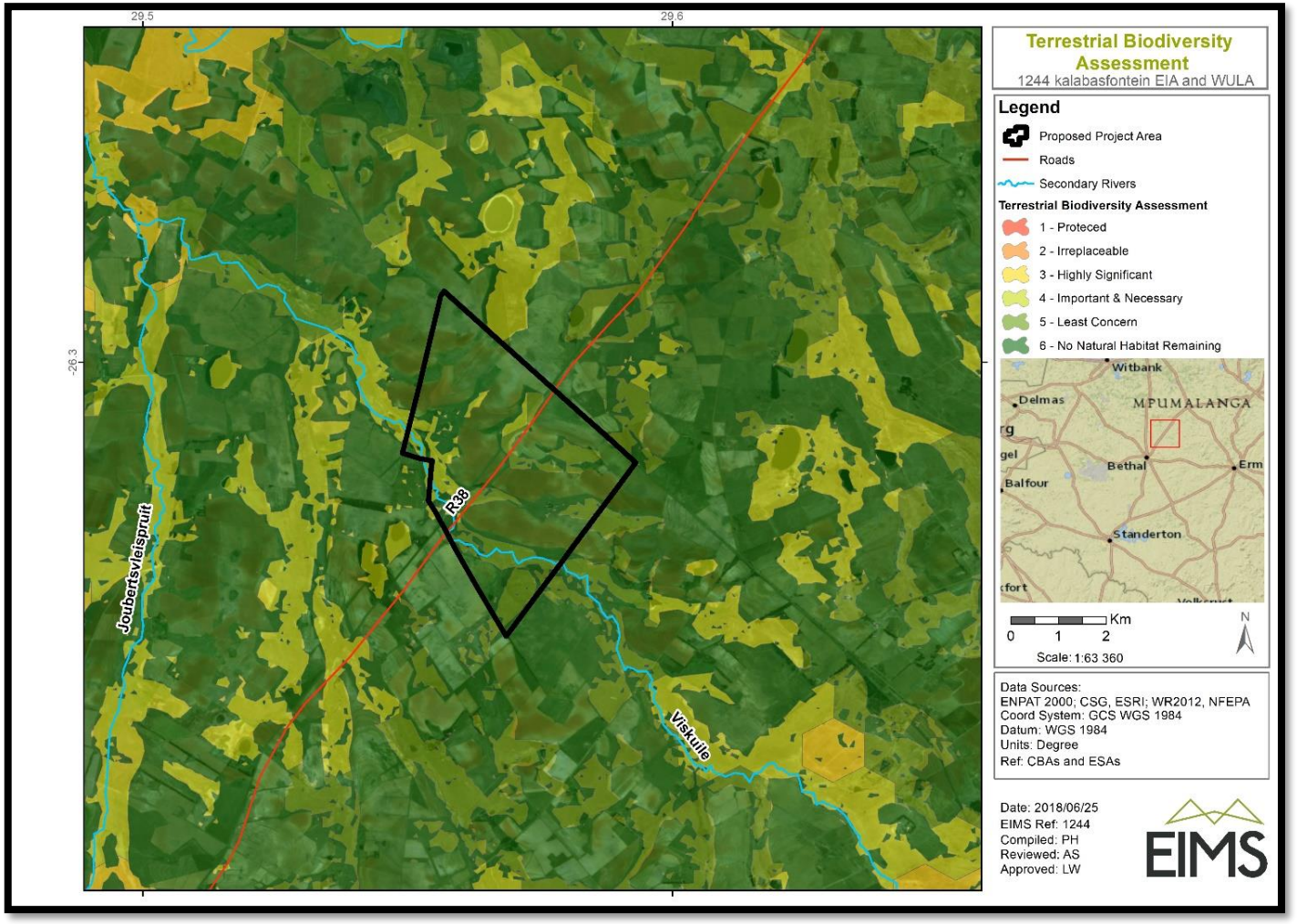

Figure 22: Terrestrial Biodiversity Assessment

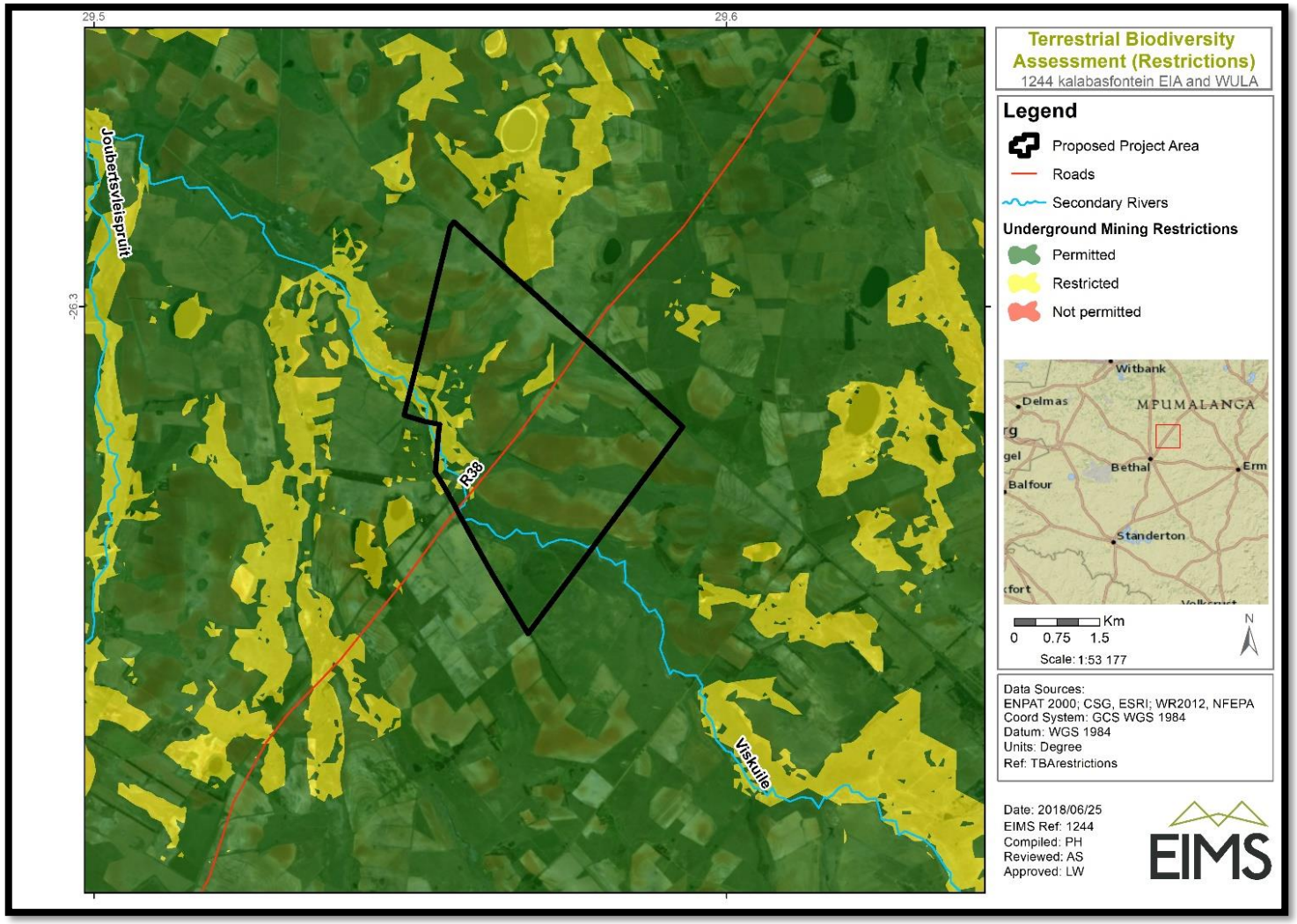

Figure 23: Terrestrial Biodiversity Assessment (Restrictions)

8.11 FAUNA

Wetlands and drainage lines, ridges, and intact patches of connected grassland; irrespective of their ecological condition, represent the most sensitive faunal habitats present within the Application area. A land cover map of the study site was used to indicate that a large proportion of the site consists of agricultural land, except for a band of wetland vegetation running across the site. Desktop analysis of IUCN data revealed that there are no faunal habitats of threatened or rare species within 5km of the proposed project area. However, the following mammal species were identified as having a probability of occurring on site:

- *Vulpez chama (*Cape fox) LC
- *Tatera brantsii* (Highveld Gerbil) LC
- *Rhabdomis pumilio* (Four striped grass rat) LC
- *Otomys angoniensis* (Angoni Vlei Rate) LC
- *Lepus capensis* (Cape Hare) LC
- *Cynictis penicillata* (Yellow Mongoose) LC
- *Atelerix frontalis* (Southern African Hedgehog) LC

The conservation status of all the faunal species listed above is Least Concern (LC) (International Union for Conservation of Nature and Natural Resources 2018). A biodiversity specialist will be appointed during the EIA of the project to conduct a detailed investigation. A portion of the project also falls in an important bird area although the IBA is not protected as indicated in Figure 24 below.

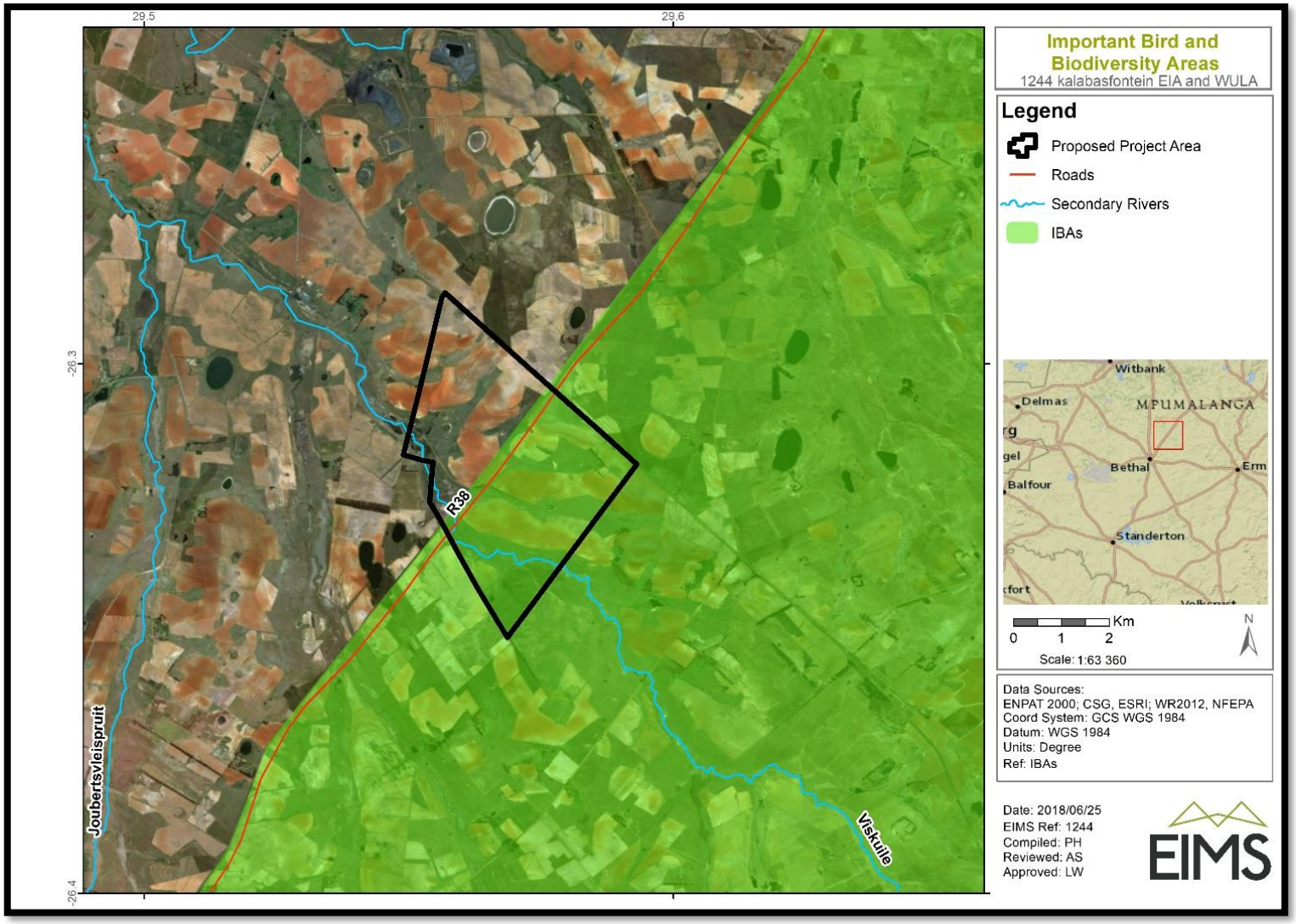

Figure 24: Important Bird Areas

8.12 SURFACE WATER

There are several waterbodies located within the proposed project area, these include NFEPA rivers and wetlands (see Figure 16). The proposed Kalabasfontein proect area is situated in quaternary catchment B11A in the Upper Olifants River catchment on the western side of the Bankspruit. The Viskuile River runs from north to south through the project area on the westerly side. The Viskuile is a stream of Present Ecological State (PES) category C watercourse, meaning that it is moderately modified. It is a tributary of the Olifants River. An aquatic specialist will be appointed during the EIA phase to conduct studies that are specific to the Kalabasfontein project area and immediate surroundings (GCS (Pty) Ltd. 2017).

8.12.1 WATER MANAGEMENT AREA (WMA)

The Kalabasfontein project area is situated in the Upper Olifants River catchment within the Olifants Water Management Area (WMA) which may be divided into four sub-areas, namely the Upper Olifants, Middle Olifants, Lower Olifants and Steelpoort sub-areas. The main tributaries of the Olifants River are the Wilge, Elands, Ga-Selati, Klein Olifants, Steelpoort, Blyde, Klaserie and Timbavati Rivers. The Olifants River is a tributary of the Limpopo River which is shared by South Africa, Botswana, Zimbabwe and Mozambique (Department of Water Affairs, 2013). As shown in Figure 25 the Kalabasfontein project area falls within the B11A quaternary catchment.

8.12.2 MEAN ANNUAL RUNOFF (MAR)

The mean annual run off for the Olifants WMA is 2 042 million m^3/a (GCS (Pty) Ltd. 2017).

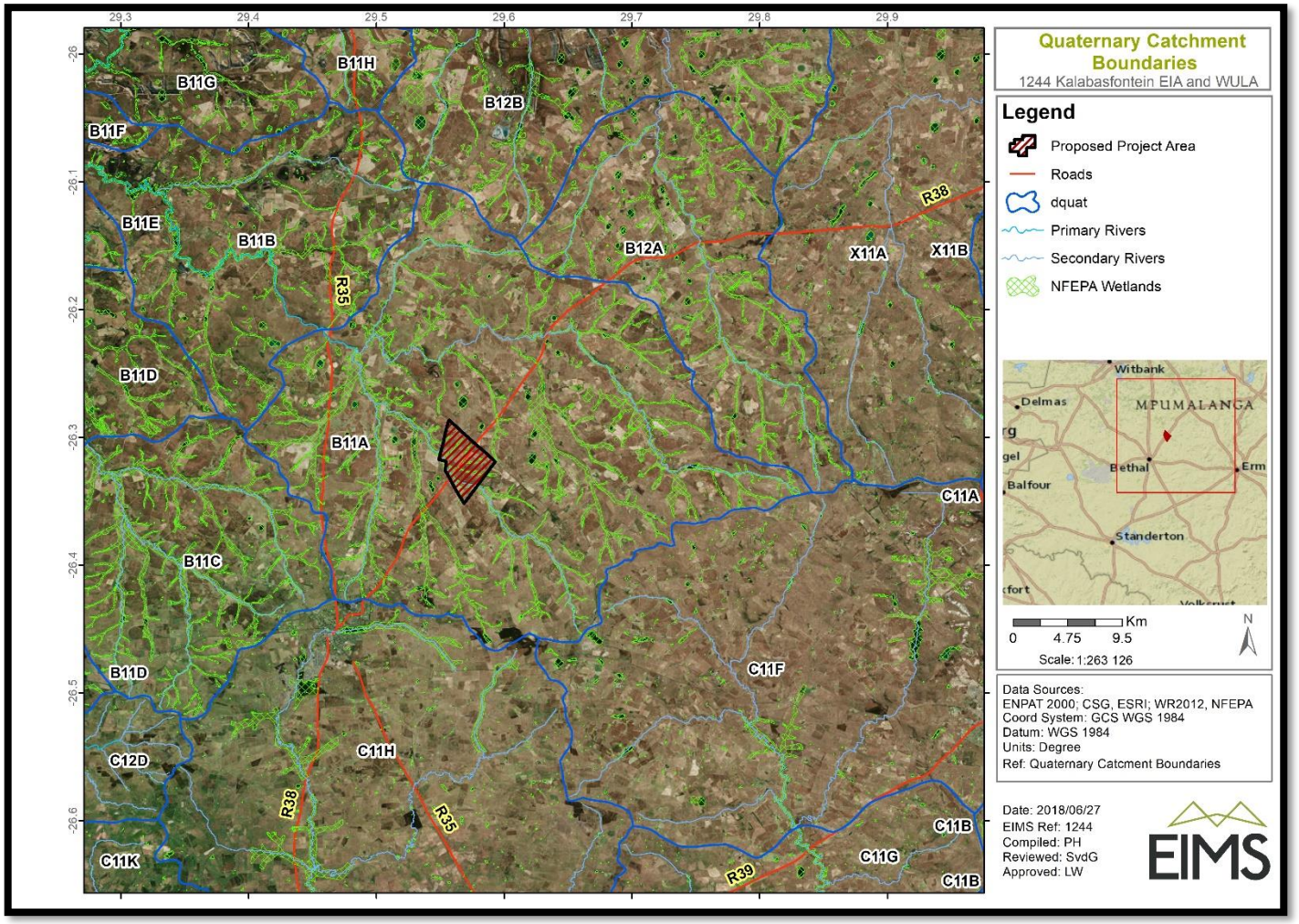

Figure 25: Quaternary Catchment Boundaries.

8.12.3 SURFACE WATER QUALITY

Aquatico has been commissioned by Exxaro Coal Central: Forzando Mine to conduct surface water quality monitoring on a monthly basis at fifteen (15) surface water localities for Forzando South. The descriptions below are based on the quarterly surface water monitoring report undertaken by Aquatico on behalf of Forzando Mine. A copy of the latest quarterly report is attached as an appendix to this Scoping Report.

Based on the calculated quarterly average (QĀ) water quality conditions of the surface water monitoring localities at Forzando, the general water quality profile can be described as neutral to alkaline (QĀ pH levels between 7.87 and 9.34 with an overall average of 8.39), non-saline to saline (QĀ TDS between 173 and 922 mg/l with an overall average of 343 mg/l classified as non-saline), slightly hard to very hard (T.H. between 110 mg/l and 342 mg/l with an overall average of 178 mg/l classified as moderately hard) (Aquatico Scientific (Pty) Ltd. 2018).Table 18 below describes the locality of the monitoring points.

Table 18: Surface Water Sampling Localities

Monitoring Point	Description	Coordinates
FSSW15	Potable Water (Kitchen)	S26.2868; E29.5307
FSSW14	Sewage Outflow	S26.2893; E29.5327
	Surface water	
FSSW01	Viskuile River by R38 (upstream site)	S26.3281; E29.5583
FSSW02	Viskuile River by R38 (upstream of site)	S26.3246; E29.5613
FSSW03	Joubertvleispruit by dirt road of R35J	S26.3028; E29.4972
FSSW04	Joubertvleispruit by dirt road off R35	S26.3025; E29.5014
FSSW05	Viskuile on the bridge	S26.278; E29.5087
FSSW06	Tributary of the Viskuile River	S26.2717; E29.5124
FSSW07	Boltons pan	S26.2989; E29.5133
FSSW08	Upstream of mining area	S26.311; E29.5493
FSSW09	Pollution Dam 1	S26.29; E29.5328
FSSW10	Pollution Dam 2	S26.2888; E29.5299
FSSW11	Pollution Dam 3	S26.2879; E29.5289
FSSW12	Erikson Dam 1	S26.2881; E29.5293
FSSW13	Erikson Dam 2	S26.2879; E29.5292

8.12.4 SURFACE WATER USE

The portion of the Olifants River catchment upstream of Forzando has largely escaped mining and related industrial development experienced by most of the remainder of the catchment area. The upstream catchment area is primarily utilised for agricultural activities as evidenced by the good water quality recorded at the mine site.

Water use from the catchment comprised the uses related to the Reserve, as well as other uses including:

- Agriculture;
- Industry (primarily related to the opencast and underground coal mining as well as power generation by means of coal fired power stations;
- Domestic, primarily related to water abstracted from Witbank dam for supply to urban area related to Witbank; and
- Recreation on the Witbank dam.

8.13 WETLANDS

There are several wetlands located within and around the Kalabasfontein project area. These comprise of floodplain wetland, channeled valley bottom wetlands (VBW), deppressions, seep, flat, unchanneled VBW and valley head seeps (Figure 16). An aquatic specialist will be appointed during the EIA phase of the study to identify and characterise these watercouses in more detail. Although there are no protected areas within the project area, Figure 26 indicates that the area along the Viskulie River on the western side of the Kalabasfontein project area is a Critical Biodiversity area.

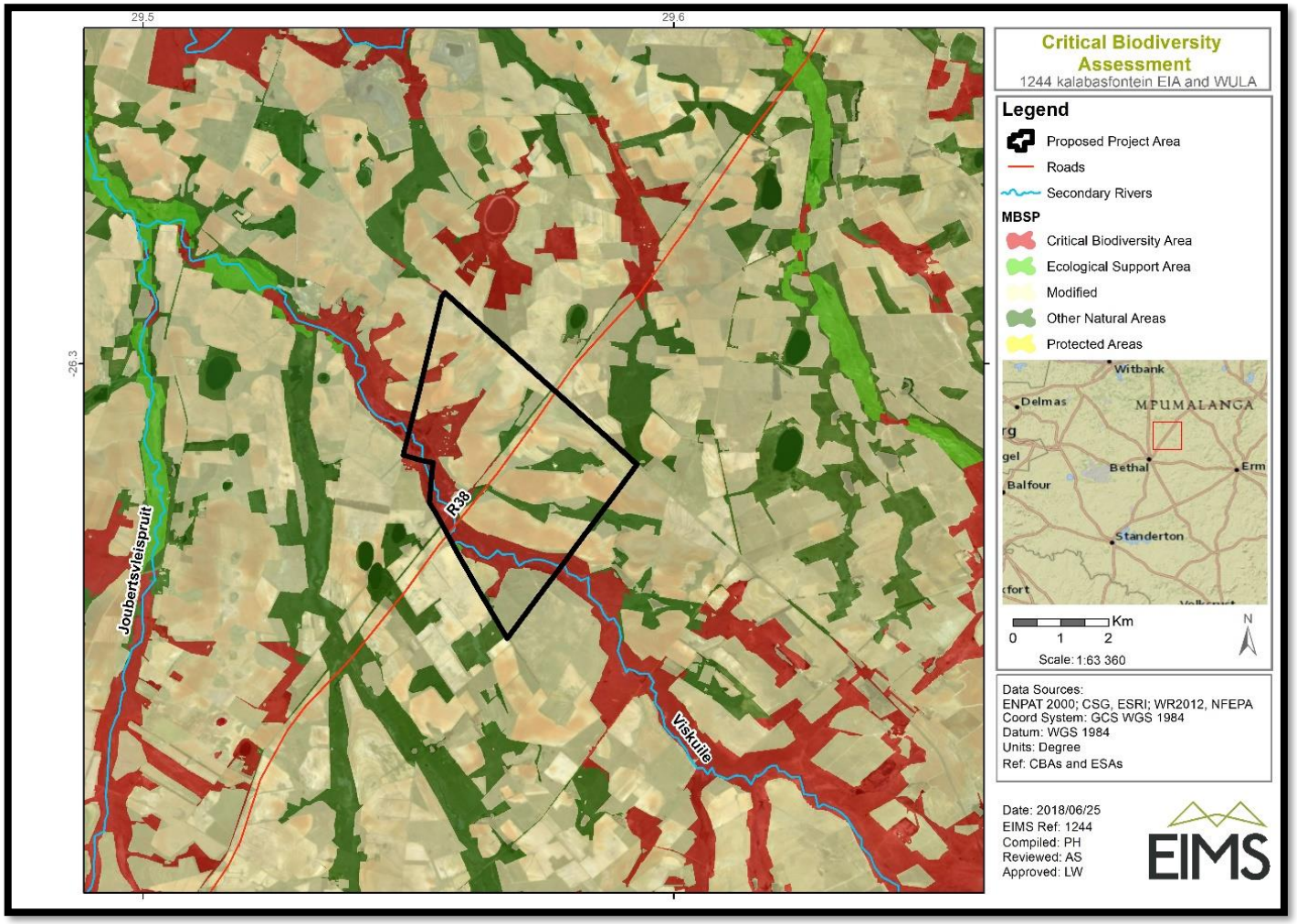

Figure 26: Critical Biodiversity areas

8.14 GROUNDWATER

The descriptions below are based on thequaterly groundwater monitoring report undertaken by Aquatico on behalf of Forzando Mine. A hydrology specialist will be appointed during the EIA phase to conduct studies that are specific to the Kalabasfontein project area and immediate surroundings.

8.14.1 AQUIFER CHARACTERISATION

According to the hydrogeological assessment conducted by GCS in 2015, two distinct superimposed groundwater systems are present within the Olifants River Catchment. They can be classified as:

- The upper weathered Ecca aquifer (shallow aquifer formed in the weathered zone of the Karoo sediments and which is locally perched on the fresh bedrock); and
- The aquifer below the Ecca sediments (deeper aquifer formed by fracturing of the Karoo sediments and dolerite intrusions (Hodgson & Krantz, 1998 and WRC report 291/1/98).

These types of groundwater systems are common to the groundwater regime that characterises a Karoo environment. The systems do not necessarily occur in isolation of one another, more often than not forming a composite groundwater regime that is comprised of one, some or all of the systems. Good hydraulic connectivity often exists between the two top aquifers and they have consequently been treated as a single unit in the modelling of groundwater flow.

8.14.1.1 SHALLOW WEATHERED AQUIFER

The Ecca sediments are weathered to depths between 5 to 12 meters below surface throughout the Olifants Catchment. The upper aquifer is associated with this weathered zone and water is often found within a few meters below surface. This aquifer is recharged by rainfall. The percentage recharge to this aquifer is estimated to be in the order of 1 – 3 % of the annual rainfall, based on work by Kirchner et al. (1991) and Bredenkamp (1978) in other parts of the country.

Rainfall that infiltrates the weathered rock soon reaches an impermeable layer of shale underlying the weathered zone. The movement of groundwater on top of this shale is lateral and in the direction of the surface slope. This water reappears on surface at fountains where the flow paths are obstructed by a barrier, such as a dolerite dyke, paleo-topographic highs in the bedrock, or where the surface topography cuts into the groundwater level at streams. It is suggested that less than 60% of the water recharged to the weathered zone eventually emanates in streams.

The aquifer within the weathered zone is generally low-yielding (range 100 – 2 000 l/h) because of its insignificant thickness. Few farmers therefore tap this aquifer by borehole. Wells or trenches, dug into the upper aquifer, are often sufficient to secure a constant water supply of excellent quality.

8.14.1.2 THE FRACTURED KAROO ROCK AQUIFERS

The pores within the Ecca sediments are too well cemented to allow any significant permeation of water. All groundwater movement is therefore along secondary structures, such as fractures, cracks and joints in the sediments. These structures are better developed in competent rocks such as sandstone, hence the better water-yielding properties of the latter rock type. Of all the un-weathered sediments in the Ecca, the coal seams often have the highest hydraulic conductivity.

8.14.2 HYDROCENSUS

Groundwater in the area is the only source of potable water. All people living in the area are reliant on the groundwater for domestic supply. All of the potable water is abstracted from the weathered and fractured Karoo aquifers with the exception of the main water supply for Mr. Jas Wasserman. Since the start of the hydro census investigation he has switched his water supply from the pre-Karoo aquifer to boreholes tapping the weathered and fractured aquifers.

The weathered and fractured Karoo aquifers also supply water for gardening purposes. The majority of stock water is obtained from groundwater, this is supplemented by surface water as and when it is available. In times of low rainfall all stock is reliant on groundwater for drinking purposes. No irrigation from groundwater was found. All irrigation is from surface water sources. Refer to Table 19 for the baseline hydrocensus completed by GCS in 2017 to identify groundwater users in the mining area. The 2017 hydrocensus was included into the original IWWMP submitted to the DWS.

Table 19: Baseline Hydro-census Information (GCS (Pty) Ltd. 2017)

BH ID	Site Description	Owner	Use
GW1	BH at Large Dam	Mr Jas Wasserman	Stock
GW2	BH East of Large Dam	Mr Jas Wasserman	Stock
GW3	BH at Johan's House	Mr Jas Wasserman	Domestic and Stock
GW4	BH East of Johan's House	Mr Jas Wasserman	Domestic and Stock
GW5	BH at Joubertspruit	Mr Jas Wasserman	Stock
GW6	BH at Joubertspruit	Mr Jas Wasserman	Stock
GW7	BH at Joubertspruit	Mr Jas Wasserman	Stock
GW8	BH at Joubertspruit	Mr Jas Wasserman	Stock
GW9	Main Water Supply BH at Stad	Mr Jas Wasserman	Domestic and Stock
GW10	BH Between Joubertspruit and Stad	Mr Jas Wasserman	Stock
GW11	Gert Slabber House	Mr Gert Slabber	Domestic and Stock
GW12	Martin Slabber House	Mr Gert Slabber	Domestic and Stock
GW13	Handpump at Workers	Mr Gert Slabber	Domestic
GW14	Hennie Slabber House	Mr Gert Slabber	Domestic and Stock
GW15	Windmill at Martin's	Mr Gert Slabber	
GW16	Handpump #2	Mr Gert Slabber	Domestic
GW17	Windmill behind Old House	Mr Gert Slabber	Not in use
GW18	Joubert Dam at Stadt	Mr Henk Joubert	Domestic and Stock
GW19	Joubert Old House	Mr Henk Joubert	
GW20	Joubert Open Borehole	Mr Henk Joubert	Not in use
GW21	Joubert House	Mr Henk Joubert	Domestic and Stock

BH ID	Site Description	Owner	Use
GW22	Joubert House	Mr Henk Joubert	
GW23	Between Small House and Dam	Mr Henk Joubert	Stock
GW24	Windmill below Kalabasfontein Workshop	Mr Hirschowitz	Domestic
GW26	Handpump at Labourers	Mr Hirschowitz	Domestic
GW28	In Middle of Pasture	Mr Hirschowitz	Stock
GW30	Open Borehole	Mr Hirschowitz	Blocked
GW36	Farmhouse	Mr Gavin Kotzen	Domestic and Stock
GW37	Farmhouse	Mr Gavin Kotzen	Domestic and Stock
GW38	Windmill	Mr Gavin Kotzen	Domestic and Stock
GW39	Springs, 2 Cemented Eyes	Mr Gavin Kotzen	Stock
GW40	Borehole	Mr Gavin Kotzen	Domestic and Stock
GW41	Windmill	Mr Gavin Kotzen	Stock
GW42	Windmill (Broken)	Mr Gavin Kotzen	Not in use
WM03	Handpump at Workers	Mr Jas Wasserman	Domestic

8.14.3 GROUNDWATER QUALITY

Aquatico was also commissioned by Exxaro Coal Central: Forzando mine to conduct ground water quality monitoring on a quarterly basis at two (2) ground water localities for Forzando South. This preliminary analyses is based on the water quality results for January to March 2018. As According to the groundwater monitoring reports by Aquatico, the quarterly pH values for the ground water monitoring localities vary between 8.26 and 8.55, indicating alkaline to neutral conditions. The quarterly salinity (TDS) concentrations indicate that the concentrations of the groundwater monitoring localities were non-saline (between 209 mg/l and 255 mg/l). Hardness concentration varied between 50 mg/l and 112 mg/l indicating moderately soft to slightly hard water conditions.

Although no standard for TH is available in the SANS241 standard, the tolerated guideline for TH, with regards to domestic use, is stipulated by DWAF as being less than 300 mg/l. All these sampling localities did comply with this guideline. None of the measured variables exceeded the SANS 241-1:2015 Drinking water limits at FSGW03 (North west of PCD's) and FSGW04 (Borehole South East of PCD) during the quarterly period from January to March 2018. The chemical quality of the water could be described as Ideal (Class 0) water quality for FSGW04 and Good (Class 01) for FSGW03 for the measured variables for domestic use. Table 20 below describes the locality of the groundwater monitoring points.

Table 20: Groundwater Sampling Localities (Aquatico Scientific (Pty) Ltd. 2018)

Monitoring Point	Description	Coordinates
Groundwater		

Monitoring Point	Description	Coordinates
FSG03	Borehole North West of PCDs	S-26.2869; E29.528
FSG04	Borehole South East of PCD	S-26.2909; E29.533

8.15 AIR QUALITY

Mining operations like drilling, blasting, hauling, and transportation are the major sources of emissions and air pollution. Emissions of particulate matter and nuisance dust will result from mineral plant operations such as crushing, screening and processing for final transportation. Fugitive emissions are also possible from roads and open stockpiles.

Nuisance dust can reduce visibility; soil or damage buildings and other materials; and increase costs due to the need for washing, cleaning and repainting. Plants can be affected by dust fallout through reduced light transmission which affects photosynthesis and can result in decreased growth. Fallout dust can also collect in watercourse causing sedimentation and a reduction in the water quality, and can also affect aquatic life through the smothering of riverine habitat and fish gill clogging. Coarse dust particles are produced during mining operations which can lead to an increase in fallout dust.

8.16 BLASTING AND VIBRATION

Blasting is common in the coal mine industry to remove overburden so that the exposed coal can be mechanically excavated. The ground vibrations produced by blasting are often felt by residents surrounding the mines. The impacts related to blasting induced vibration, such as air blast, fly rock, dust, and fumes need to be evaluated. Their impact on structures, people and animals also need to be evaluated.

The following mitigating measures are being implemented to minimise impacts associated with blasting and vibrations:

- A drilling and blasting standard operating procedure (SOP) has been developed for the mine;
- A 20-m cut depth in the pit is mined so as to reduce the amount of explosives used at any one time;
- A pre-and post-blast checklist is completed in by the responsible blaster and signed off by the responsible managers.
- Only single hole blasts are undertaken to reduce air blast and vibrations;
- Pre-spilt blasts are utilised to ensure the primary blast energy is contained within the blast area therefore reducing ground vibrations;
- Only a trained and certified blaster with certified blasting assistants are used;
- Blast designs are continuously re-evaluated according to prevailing conditions and geological conditions; and
- Climatic conditions and time of day are considered before a blast is undertaken.

8.17 VISUAL

At present the visual character of the area is dominated by agricultural activities (maize cultivation and grazing of cattle), as well as mining related infrastructures such as the existing plant area and existing coal discard facilities. The mine site is located remotely from any substantial population settlement or any major thoroughfares. As a result, the limited deterioration in aesthetic quality will only be witnessed by the persons located in close proximity of the mine site. Furthermore, the infrastructure related to the mine is limited in height and does not involve any facility to a height of greater than approximately 50m. The undulating nature of the surrounding landscape is effective in concealing the mine related infrastructure from the surrounding

area at present (GCS (Pty) ltd. 2010). Since there will be minimal surface infrastructure for the Kalabasfontein project, the visual impact of the proposed project is relatively low.

The visual appearance of the towns in the area, particularly as viewed from the main roads through them, is often unattractive, due to litter and poor solid waste management, lack of landscaping, urban decay and poor-quality, uncontrolled development. There is no common approach to signage within the area (Msukaligwa Local Municipality 2010)

9 ENVIRONMENTAL IMPACT ASSESSMENT

9.1 THE IMPACT ASSESSMENT METHODOLOGY

The impact significance rating 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).

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:

$$\boldsymbol{C} = \left(\frac{(\boldsymbol{E} + \boldsymbol{D} + \boldsymbol{M} + \boldsymbol{R})}{\boldsymbol{4}}\right) \times \boldsymbol{N}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 21.

Table 21: Criteria for determination of 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),

Aspect	Score	Definition
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of 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 22.

Table 22: Probability scoring

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:

$$\boldsymbol{ER = C \times P}$$

Table 23: 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 Table 24.

Table 24: 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.

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented 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.

In an effort 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 25: Criteria for the determination of 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 Table 25. The impact priority is therefore determined as follows:

Priority = PR + CI + 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 26).

Table 26: 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

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate 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). The environmental significance rating is presented in Table 27.

Table 27: 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).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

9.2 IMPACTS IDENTIFIED

This section presents the potential impacts that have been identified during the scoping phase assessment. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final Scoping Report submitted to the DMR for adjudication. The results of the public consultation will be used to update the identified potential impacts which will be further refined during the course of the EIA assessment and consultation process.

Potential environmental impacts will be updated during the EIA phase of the project. These impacts were identified by the EAP, the appointed specialists, as well as the public. Table 28 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 28: 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 for ventilation shaft Planned placement of infrastructure Ventilation shaftVentilation Shaft		• 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	• 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.).	• Disturbance/Destruction of Archaeological Sites • Disturbance/Destruction of Historic Buildings or Structures • Disturbance/ Destruction of Graves and Cemeteries • Disturbance/ Destruction of Unmarked Graves
Human resources management (Planning)	Employment/recruitment I&AP consultations CSI initiatives Skills development programmes Environmental awareness training HIV/AIDS Awareness programmes Integration with Municipalities' strategic long-term planning			• Perceptions and Expectations. • Employment Opportunities. • Inability of the community to capture economic benefits & managing expectations.	
Earthworks (Construction)	Stripping and stockpiling of soils(Ventilation shaft) Cleaning, grubbing and bulldozing(Ventilation shaft) Removal of cleared vegetation Digging trenches and foundations	• Loss/ Disturbance of Topsoil (including contamination, erosion and compaction) • Gaseous and particulate emissions; fugitive dust	• Pollution of habitats • Removal of threatened and protected species • Loss/ Destruction of Natural Habit	• Loss of agricultural resource • Visual impacts • Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	• Disturbance/ Destruction of fossils • Disturbance/Destruction of Archaeological Sites • Disturbance/Destruction of Historic Buildings or Structures

	Blasting Maintenance of storm water management measures Maintenance of firebreak Ventilation shaft	• 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 • Alteration of the topography during excavation	• 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		• Disturbance/ Destruction of Graves and Cemeteries. • Disturbance/ Destruction of Unmarked Graves
Civil Works (Construction)	Maintenance of infrastructure and services Mixing of concrete and concrete works Establishment of PCD and storm water/return water dam Establishment of dewatering pipelines Existing Mobile office and ablution block Sewage and sanitation Existing fuel storage area	• Gaseous and particulate emissions; fugitive dust • Generation of $PM_{2.5}$ and PM_{10} • Gaseous and particulate emissions; fugitive dust. • Deterioration of water quality • Decline in habitat integrity	• 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.	• Loss of agricultural resource	• Disturbance/Destruction of Archaeological Sites • Disturbance/Destruction of Historic Buildings or Structures • Disturbance/ Destruction of Graves and Cemeteries • Disturbance/ Destruction of Unmarked Graves

	Existing Chemical storage area Existing General waste area Access control and security General site management	• Loss of species sensitive to changes in water quality • Altered hydrological regimes • Decline in aquatic habitat integrity • Impacts on wetlands • Surface water contamination	• Blockage of Seasonal and Dispersal Movements. • 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		
Underground Mining (Operation)	• Drilling • Blasting • Excavations • Removal of overburden by dozing and load haul • Upgrade of internal haul roads • Removal of coal	• Potential risk of subsidence • Ground water pollution or contamination due to spillage of chemicals, hydrocarbons, or contaminated water during mining activities; • A reduction in recharge to	• Displacement of Faunal Species •	• Change of land use from agriculture to mining • Sustainable employment for current mine employees • Increase traffic incidences due to additional haulage • Increase in traffic on adjacent road	• Disturbance of graves/ burial sites • Potential damage of Palaeontological material

	• Continued use of existing RoM stockpiles • Continued use of existing Product Stockpiles • Pumping of water to PCD • Waste rock dumps for backfilling • Soil management • Water management • Concurrent rehabilitation • Water treatment	groundwater due to surface compaction; • Reduction of ground water reserves due to mine dewatering; • Reduction of stream baseflow, surrounding ground water levels, and aquifer levels as a result of mine dewatering; and • The potential contamination of groundwater due to the continued oxidation of coal material in the mine void and the waste material on-site.		network resulting in additional damage to the roads	
Infrastructure removal (Decommissioning)	Dismantling and demolition of infrastructure Safety control	• Gaseous and particulate emissions; fugitive dust • Generation of PM2.5 and PM10 • Contamination of Groundwater. • Damage to Wetland/ Drainage Lines	• Fragmentation and Edge Effects. • Displacement of Faunal Species.	• Safety and Security (i.e. access to properties, theft, fire hazards, etc.)	
Rehabilitation (Closure)	Backfilling of pits and voids Slope stabilisation Erosion control Landscaping Replacing topsoil	• Contamination of Groundwater. • Acid Mine Drainage • Damage to Wetland/ Drainage Lines	• Fragmentation and Edge Effects. • Displacement of Faunal Species. • Fuel, waste, sedimentation.	• Reduction in future land capability. • Safety risk to public	

	Removal of alien/invasive vegetation				
	Re-vegetation				
	Restoration of natural drainage patterns				
	Remediation of ground and surface water				
	Rehabilitation of external roads				
Maintenance (Post closure)	Initiate maintenance and aftercare program	• 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. These preliminary impact calculations will be subject to amendment based on the EIA phase assessment and the will also incorporate the results of public consultation undertaken during the EIA phase. The impact assessment matrix is included in Appendix 4 and the below subsections describe each impact in more detail. Alternative 1 is the no-go alternative and hence the impact associated with this alternative are rated as zero.

9.3.1 PRELIMINARY IMPACTS ON HERITAGE AND PALAEONTOLOGICAL RESOURCES

This section presents the preliminary potential impacts identified with regard to heritage resources. While several project phases exist, only impacts associated with the Site Establishment and Earthworks / Construction Phase and operation are included here. The reason for this is that no impacts are anticipated on heritage resources during the other phases of the project. A heritage and palaeontological specialist study will be undertaken, and the results presented in the EIA phase with relevant updates to this section made.

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

- Disturbance/Destruction of Archaeological Sites
- Disturbance/Destruction of Historic Buildings or Structures
- Disturbance/ Destruction of Graves and Cemeteries
- Disturbance/ Destruction of Unmarked Graves
- Potential damage of Palaeontological material

Table 29: Impacts on Heritage and Palaeontological Resources

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Disturbance/Destruction of Archaeological Sites	Alternative 3	Construction	-13	-5,5	-5,50
Disturbance/Destruction of Historic Buildings or Structures	Alternative 3	Construction	-13	-5,5	-5,50
Disturbance/ Destruction of Graves and Cemeteries	Alternative 3	Construction	-14	-6	-6,00
Disturbance/ Destruction of Unmarked Graves	Alternative 3	Construction	-13	-5,5	-5,50
Potential damage of Palaeontological material	Alternative 3	Construction	-15	-6	-6,00
Disturbance/Destruction of Archaeological Sites	Alternative 3	Operation	-13	-5,5	-5,50
Disturbance/Destruction of Historic Buildings or Structures	Alternative 3	Operation	-13	-5,5	-5,50
Disturbance/ Destruction of	Alternative 3	Operation	-14	-6	-6,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Graves and Cemeteries					
Disturbance/ Destruction of Unmarked Graves	Alternative 3	Operation	-13	-5,5	-5,50
Potential damage of Palaeontological material	Alternative 3	Operation	-15	-6	-6,00
Disturbance/Destruction of Archaeological Sites	Alternative 2	Construction	-20	-12,5	-12,50
Disturbance/Destruction of Historic Buildings or Structures	Alternative 2	Construction	-17,5	-10	-10,00
Disturbance/ Destruction of Graves and Cemeteries	Alternative 2	Construction	-17,5	-16,25	-16,25
Disturbance/ Destruction of Unmarked Graves	Alternative 2	Construction	-17,5	-10	-10,00
Potential damage of Palaeontological material	Alternative 2	Construction	-20	-17,5	-17,50
Disturbance/Destruction of Archaeological Sites	Alternative 2	Operation	-20	-12,5	-12,50
Disturbance/Destruction of Historic Buildings or Structures	Alternative 2	Operation	-17,5	-10	-10,00
Disturbance/ Destruction of Graves and Cemeteries	Alternative 2	Operation	-17,5	-16,25	-16,25
Disturbance/ Destruction of Unmarked Graves	Alternative 2	Operation	-17,5	-10	-10,00
Potential damage of Palaeontological material	Alternative 2	Operation	-20	-17,5	-17,50
Disturbance/Destruction of Archaeological Sites	Alternative 1	Construction	0	0	0,00
Disturbance/Destruction of Historic Buildings or Structures	Alternative 1	Construction	0	0	0,00
Disturbance/ Destruction of Graves and Cemeteries	Alternative 1	Construction	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Disturbance/ Destruction of Unmarked Graves	Alternative 1	Construction	0	0	0,00
Potential damage of Palaeontological material	Alternative 1	Construction	0	0	0,00
Disturbance/Destruction of Archaeological Sites	Alternative 1	Operation	0	0	0,00
Disturbance/Destruction of Historic Buildings or Structures	Alternative 1	Operation	0	0	0,00
Disturbance/ Destruction of Graves and Cemeteries	Alternative 1	Operation	0	0	0,00
Disturbance/ Destruction of Unmarked Graves	Alternative 1	Operation	0	0	0,00
Potential damage of Palaeontological material	Alternative 1	Operation	0	0	0,00

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. Although limited to the ventilation shaft area, 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 agricultural 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. Below are the preliminary impacts on ecological resources identified during scoping for the construction, operation and rehabilitation phases of the Kalabasfontein project as well as their impact ratings. The reason for assessment of only these three phases being assessed is that no impacts are anticipated on during the other phases of the project.

- 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
- Pollution of habitats
- Habitat Fragmentation and Edge Effects
- Blockage of Seasonal and Dispersal Movements
- Loss of primary vegetation communities
- Loss of species sensitive to changes in water quality

- Increase in the occurrence of alien invasive vegetation

Table 30: Preliminary impacts on Ecology

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Removal of threatened and protected species	Alternative 3	Construction	-12	-4,5	-4,50
Loss/ Destruction of Natural Habitats	Alternative 3	Construction	-12	-4,5	-4,50
Displacement of Faunal Species	Alternative 3	Construction	-12	-4,5	-4,50
Flora Direct and Indirect Mortality	Alternative 3	Construction	-12	-4,5	-4,50
Fauna Direct and Indirect Mortality	Alternative 3	Construction	-12	-4,5	-4,50
Pollution of habitats	Alternative 3	Construction	-12	-4,5	-4,50
Habitat Fragmentation and Edge Effects	Alternative 3	Construction	-12	-4,5	-4,50
Blockage of Seasonal and Dispersal Movements	Alternative 3	Construction	-12	-4,5	-4,50
Loss of primary vegetation communities	Alternative 3	Construction	-12	-4,5	-4,50
Loss of species sensitive to changes in water quality	Alternative 3	Construction	-12	-4,5	-4,50
Increase in the occurrence of alien invasive vegetation	Alternative 3	Construction	-12	-4,5	-4,50
Removal of threatened and protected species	Alternative 3	Operation	-12	-4,5	-4,50
Loss/ Destruction of Natural Habitats	Alternative 3	Operation	-12	-4,5	-4,50
Displacement of Faunal Species	Alternative 3	Operation	-12	-4,5	-4,50
Flora Direct and Indirect Mortality	Alternative 3	Operation	-12	-4,5	-4,50
Fauna Direct and Indirect Mortality	Alternative 3	Operation	-12	-4,5	-4,50
Pollution of habitats	Alternative 3	Operation	-12	-4,5	-4,50
Habitat Fragmentation and Edge Effects	Alternative 3	Operation	-12	-4,5	-4,50
Blockage of Seasonal and Dispersal Movements	Alternative 3	Operation	-12	-4,5	-4,50
Loss of primary vegetation communities	Alternative 3	Operation	-12	-4,5	-4,50
Loss of species sensitive to changes in water quality	Alternative 3	Operation	-12	-4,5	-4,50
Increase in the occurrence of alien invasive vegetation	Alternative 3	Operation	-12	-4,5	-4,50
Loss/ Destruction of Natural Habitats	Alternative 3	Rehab and closure	-12	-4,5	-4,50

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Displacement of Faunal Species	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Flora Direct and Indirect Mortality	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Fauna Direct and Indirect Mortality	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Pollution of habitats	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Habitat Fragmentation and Edge Effects	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Blockage of Seasonal and Dispersal Movements	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Loss of primary vegetation communities	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Loss of species sensitive to changes in water quality	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Increase in the occurrence of alien invasive vegetation	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Removal of threatened and protected species	Alternative 2	Construction	-18,75	-14	-14,00
Loss/ Destruction of Natural Habitats	Alternative 2	Construction	-18,75	-14	-14,00
Displacement of Faunal Species	Alternative 2	Construction	-18,75	-14	-14,00
Flora Direct and Indirect Mortality	Alternative 2	Construction	-18,75	-14	-14,00
Fauna Direct and Indirect Mortality	Alternative 2	Construction	-18,75	-14	-14,00
Pollution of habitats	Alternative 2	Construction	-18,75	-14	-14,00
Habitat Fragmentation and Edge Effects	Alternative 2	Construction	-18,75	-14	-14,00
Blockage of Seasonal and Dispersal Movements	Alternative 2	Construction	-18,75	-14	-14,00
Loss of primary vegetation communities	Alternative 2	Construction	-18,75	-14	-14,00
Loss of species sensitive to changes in water quality	Alternative 2	Construction	-18,75	-14	-14,00
Increase in the occurrence of alien invasive vegetation	Alternative 2	Construction	-18,75	-14	-14,00
Removal of threatened and protected species	Alternative 2	Operation	-18,75	-14	-14,00
Loss/ Destruction of Natural Habitats	Alternative 2	Operation	-18,75	-14	-14,00
Displacement of Faunal Species	Alternative 2	Operation	-18,75	-14	-14,00
Flora Direct and Indirect Mortality	Alternative 2	Operation	-18,75	-14	-14,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Fauna Direct and Indirect Mortality	Alternative 2	Operation	-18,75	-14	-14,00
Pollution of habitats	Alternative 2	Operation	-18,75	-14	-14,00
Habitat Fragmentation and Edge Effects	Alternative 2	Operation	-18,75	-14	-14,00
Blockage of Seasonal and Dispersal Movements	Alternative 2	Operation	-18,75	-14	-14,00
Loss of primary vegetation communities	Alternative 2	Operation	-18,75	-14	-14,00
Loss of species sensitive to changes in water quality	Alternative 2	Operation	-18,75	-14	-14,00
Increase in the occurrence of alien invasive vegetation	Alternative 2	Operation	-18,75	-14	-14,00
Loss/ Destruction of Natural Habitats	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Displacement of Faunal Species	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Flora Direct and Indirect Mortality	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Fauna Direct and Indirect Mortality	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Pollution of habitats	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Habitat Fragmentation and Edge Effects	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Blockage of Seasonal and Dispersal Movements	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Loss of primary vegetation communities	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Loss of species sensitive to changes in water quality	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Increase in the occurrence of alien invasive vegetation	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Removal of threatened and protected species	Alternative 1	Construction	0	0	0,00
Loss/ Destruction of Natural Habitats	Alternative 1	Construction	0	0	0,00
Displacement of Faunal Species	Alternative 1	Construction	0	0	0,00
Flora Direct and Indirect Mortality	Alternative 1	Construction	0	0	0,00
Fauna Direct and Indirect Mortality	Alternative 1	Construction	0	0	0,00
Pollution of habitats	Alternative 1	Construction	0	0	0,00
Habitat Fragmentation and Edge Effects	Alternative 1	Construction	0	0	0,00
Blockage of Seasonal and Dispersal Movements	Alternative 1	Construction	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Loss of primary vegetation communities	Alternative 1	Construction	0	0	0,00
Loss of species sensitive to changes in water quality	Alternative 1	Construction	0	0	0,00
Increase in the occurrence of alien invasive vegetation	Alternative 1	Construction	0	0	0,00
Removal of threatened and protected species	Alternative 1	Operation	0	0	0,00
Loss/ Destruction of Natural Habitats	Alternative 1	Operation	0	0	0,00
Displacement of Faunal Species	Alternative 1	Operation	0	0	0,00
Flora Direct and Indirect Mortality	Alternative 1	Operation	0	0	0,00
Fauna Direct and Indirect Mortality	Alternative 1	Operation	0	0	0,00
Pollution of habitats	Alternative 1	Operation	0	0	0,00
Habitat Fragmentation and Edge Effects	Alternative 1	Operation	0	0	0,00
Blockage of Seasonal and Dispersal Movements	Alternative 1	Operation	0	0	0,00
Loss of primary vegetation communities	Alternative 1	Operation	0	0	0,00
Loss of species sensitive to changes in water quality	Alternative 1	Operation	0	0	0,00
Increase in the occurrence of alien invasive vegetation	Alternative 1	Operation	0	0	0,00
Loss/ Destruction of Natural Habitats	Alternative 1	Rehab and closure	0	0	0,00
Displacement of Faunal Species	Alternative 1	Rehab and closure	0	0	0,00
Flora Direct and Indirect Mortality	Alternative 1	Rehab and closure	0	0	0,00
Fauna Direct and Indirect Mortality	Alternative 1	Rehab and closure	0	0	0,00
Pollution of habitats	Alternative 1	Rehab and closure	0	0	0,00
Habitat Fragmentation and Edge Effects	Alternative 1	Rehab and closure	0	0	0,00
Blockage of Seasonal and Dispersal Movements	Alternative 1	Rehab and closure	0	0	0,00
Loss of primary vegetation communities	Alternative 1	Rehab and closure	0	0	0,00
Loss of species sensitive to changes in water quality	Alternative 1	Rehab and closure	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Increase in the occurrence of alien invasive vegetation	Alternative 1	Rehab and closure	0	0	0,00

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. A Geohydrological Specialist Study will be undertaken as part of this application and will inform the EIR/EMPR. As such, the findings and mitigation measures will be updated accordingly.

- A reduction in recharge to groundwater due to surface compaction;
- Reduction of ground water reserves due to mine dewatering;
- Potential risk of subsidence;
- Contamination of Groundwater;
- Altered Hydrological Regime;
- Acid Mine Drainage

Table 31: Preliminary Impacts on geohydrology

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Reduction in recharge to groundwater due to surface compaction	Alternative 3	Construction	-10,5	-5,5	-5,50
Reduction of ground water reserves due to mine dewatering	Alternative 3	Construction	-10,5	-5,5	-5,50
Potential risk of subsidence	Alternative 3	Construction	-10,5	-5,5	-5,50
Contamination of Groundwater	Alternative 3	Construction	-10,5	-5,5	-5,50
Altered Hydrological Regime	Alternative 3	Construction	-10,5	-5,5	-5,50
Acid Mine Drainage	Alternative 3	Construction	-10,5	-6	-6,00
Reduction in recharge to groundwater due to	Alternative 3	Operation	-20	-14	-14,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
surface compaction					
Reduction of ground water reserves due to mine dewatering	Alternative 3	Operation	-20	-14	-14,00
Potential risk of subsidence	Alternative 3	Operation	-20	-14	-14,00
Contamination of Groundwater	Alternative 3	Operation	-20	-14	-14,00
Altered Hydrological Regime	Alternative 3	Operation	-20	-14	-14,00
Acid Mine Drainage	Alternative 3	Operation	-20	-13	-13,00
Reduction in recharge to groundwater due to surface compaction	Alternative 3	Rehab and closure	-13	-9	-9,00
Reduction of ground water reserves due to mine dewatering	Alternative 3	Rehab and closure	-13	-9	-9,00
Potential risk of subsidence	Alternative 3	Rehab and closure	-13	-9	-9,00
Contamination of Groundwater	Alternative 3	Rehab and closure	-13	-9	-9,00
Altered Hydrological Regime	Alternative 3	Rehab and closure	-13	-9	-9,00
Acid Mine Drainage	Alternative 3	Rehab and closure	-12	-4,5	-4,50
Reduction in recharge to groundwater due to surface compaction	Alternative 2	Construction	-18,75	-13	-13,00
Reduction of ground water reserves due to mine dewatering	Alternative 2	Construction	-18,75	-13	-13,00
Potential risk of subsidence	Alternative 2	Construction	-17,5	-13	-13,00
Contamination of Groundwater	Alternative 2	Construction	-18,75	-13	-13,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Altered Hydrological Regime	Alternative 2	Construction	-18,75	-13	-13,00
Acid Mine Drainage	Alternative 2	Construction	-18,75	-13	-13,00
Reduction in recharge to groundwater due to surface compaction	Alternative 2	Operation	-20	-14	-14,00
Reduction of ground water reserves due to mine dewatering	Alternative 2	Operation	-20	-14	-14,00
Potential risk of subsidence	Alternative 2	Operation	-20	-14	-14,00
Contaminatio n of Groundwater	Alternative 2	Operation	-20	-14	-14,00
Altered Hydrological Regime	Alternative 2	Operation	-20	-14	-14,00
Acid Mine Drainage	Alternative 2	Operation	-20	-14	-14,00
Reduction in recharge to groundwater due to surface compaction	Alternative 2	Rehab and closure	-13	-9	-9,00
Reduction of ground water reserves due to mine dewatering	Alternative 2	Rehab and closure	-13	-9	-9,00
Potential risk of subsidence	Alternative 2	Rehab and closure	-13	-9	-9,00
Contaminatio n of Groundwater	Alternative 2	Rehab and closure	-13	-9	-9,00
Altered Hydrological Regime	Alternative 2	Rehab and closure	-13	-9	-9,00
Acid Mine Drainage	Alternative 2	Rehab and closure	-13	-9	-9,00
Reduction in recharge to groundwater due to surface compaction	Alternative 1	Construction	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Reduction of ground water reserves due to mine dewatering	Alternative 1	Construction	0	0	0,00
Potential risk of subsidence	Alternative 1	Construction	0	0	0,00
Contamination of Groundwater	Alternative 1	Construction	0	0	0,00
Altered Hydrological Regime	Alternative 1	Construction	0	0	0,00
Acid Mine Drainage	Alternative 1	Construction	0	0	0,00
Reduction in recharge to groundwater due to surface compaction	Alternative 1	Operation	0	0	0,00
Reduction of ground water reserves due to mine dewatering	Alternative 1	Operation	0	0	0,00
Potential risk of subsidence	Alternative 1	Operation	0	0	0,00
Contamination of Groundwater	Alternative 1	Operation	0	0	0,00
Altered Hydrological Regime	Alternative 1	Operation	0	0	0,00
Acid Mine Drainage	Alternative 1	Operation	0	0	0,00
Reduction in recharge to groundwater due to surface compaction	Alternative 1	Rehab and closure	0	0	0,00
Reduction of ground water reserves due to mine dewatering	Alternative 1	Rehab and closure	0	0	0,00
Potential risk of subsidence	Alternative 1	Rehab and closure	0	0	0,00
Contamination of Groundwater	Alternative 1	Rehab and closure	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Altered Hydrological Regime	Alternative 1	Rehab and closure	0	0	0,00
Acid Mine Drainage	Alternative 1	Rehab and closure	0	0	0,00

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.

- Reduction in stream flow;
- Deterioration of water quality;
- Altered hydrological regimes;
- There is the potential for flood lines to negatively affect the surface area of the mine;
- Decreased infiltration and increased run-off may occur due to soil compaction;
- Damage to Wetland/ Drainage Lines;
- Impacts on wetlands; and
- Surface water pollution or contamination due to acid mine drainage, spillage of chemicals, hydrocarbons, or contaminated water during mining activities.

Table 32: Impacts on Hydrology

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Reduction in stream flow	Alternative 3	Construction	-18,75	-9	-9,00
Deterioration of water quality	Alternative 3	Construction	-18,75	-9	-9,00
Altered hydrological regimes	Alternative 3	Construction	-18,75	-9	-9,00
Potential for flood lines to negatively affect the surface area of the mine	Alternative 3	Construction	-18,75	-9	-9,00
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 3	Construction	-18,75	-9	-9,00
Damage to Wetland/ Drainage Lines	Alternative 3	Construction	-18,75	-9	-9,00
Impacts on wetlands	Alternative 3	Construction	-15	-8,25	-8,25
Surface water pollution or contamination	Alternative 3	Construction	-12	-8,25	-8,25
Reduction in stream flow	Alternative 3	Operation	-12	-7,5	-7,50
Deterioration of water quality	Alternative 3	Operation	-12	-7,5	-7,50
Altered hydrological regimes	Alternative 3	Operation	-12	-7,5	-7,50

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Potential for flood lines to negatively affect the surface area of the mine	Alternative 3	Operation	-12	-7,5	-7,50
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 3	Operation	-12	-7,5	-7,50
Damage to Wetland/ Drainage Lines	Alternative 3	Operation	-12	-7,5	-7,50
Impacts on wetlands	Alternative 3	Operation	-12	-7,5	-7,50
Surface water pollution or contamination	Alternative 3	Operation	-12	-7,5	-7,50
Reduction in stream flow	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Deterioration of water quality	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Altered hydrological regimes	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Potential for flood lines to negatively affect the surface area of the mine	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Damage to Wetland/ Drainage Lines	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Impacts on wetlands	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Surface water pollution or contamination	Alternative 3	Rehab and closure	-12	-7,5	-7,50
Reduction in stream flow	Alternative 2	Construction	-14	-9,75	-9,75
Deterioration of water quality	Alternative 2	Construction	-14	-9,75	-9,75
Altered hydrological regimes	Alternative 2	Construction	-14	-9,75	-9,75
Potential for flood lines to negatively affect the surface area of the mine	Alternative 2	Construction	-14	-9,75	-9,75
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 2	Construction	-14	-9,75	-9,75
Damage to Wetland/ Drainage Lines	Alternative 2	Construction	-14	-9,75	-9,75
Impacts on wetlands	Alternative 2	Construction	-14	-9,75	-9,75
Surface water pollution or contamination	Alternative 2	Construction	-14	-9,75	-9,75
Reduction in stream flow	Alternative 2	Operation	-21,25	-15	-15,00
Deterioration of water quality	Alternative 2	Operation	-21,25	-15	-15,00
Altered hydrological regimes	Alternative 2	Operation	-21,25	-15	-15,00
Potential for flood lines to negatively affect the surface area of the mine	Alternative 2	Operation	-18,75	-15	-15,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 2	Operation	-21,25	-15	-15,00
Damage to Wetland/ Drainage Lines	Alternative 2	Operation	-21,25	-15	-15,00
Impacts on wetlands	Alternative 2	Operation	-21,25	-15	-15,00
Surface water pollution or contamination	Alternative 2	Operation	-18,75	-15	-15,00
Reduction in stream flow	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Deterioration of water quality	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Altered hydrological regimes	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Potential for flood lines to negatively affect the surface area of the mine	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Damage to Wetland/ Drainage Lines	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Impacts on wetlands	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Surface water pollution or contamination	Alternative 2	Rehab and closure	-18,75	-14	-14,00
Reduction in stream flow	Alternative 1	Construction	0	0	0,00
Deterioration of water quality	Alternative 1	Construction	0	0	0,00
Altered hydrological regimes	Alternative 1	Construction	0	0	0,00
Potential for flood lines to negatively affect the surface area of the mine	Alternative 1	Construction	0	0	0,00
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 1	Construction	0	0	0,00
Damage to Wetland/ Drainage Lines	Alternative 1	Construction	0	0	0,00
Impacts on wetlands	Alternative 1	Construction	0	0	0,00
Surface water pollution or contamination	Alternative 1	Construction	0	0	0,00
Reduction in stream flow	Alternative 1	Operation	0	0	0,00
Deterioration of water quality	Alternative 1	Operation	0	0	0,00
Altered hydrological regimes	Alternative 1	Operation	0	0	0,00
Potential for flood lines to negatively affect the surface area of the mine	Alternative 1	Operation	0	0	0,00
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 1	Operation	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Damage to Wetland/ Drainage Lines	Alternative 1	Operation	0	0	0,00
Impacts on wetlands	Alternative 1	Operation	0	0	0,00
Surface water pollution or contamination	Alternative 1	Operation	0	0	0,00
Reduction in stream flow	Alternative 1	Rehab and closure	0	0	0,00
Deterioration of water quality	Alternative 1	Rehab and closure	0	0	0,00
Altered hydrological regimes	Alternative 1	Rehab and closure	0	0	0,00
Potential for flood lines to negatively affect the surface area of the mine	Alternative 1	Rehab and closure	0	0	0,00
Decreased infiltration and increased run-off may occur due to soil compaction	Alternative 1	Rehab and closure	0	0	0,00
Damage to Wetland/ Drainage Lines	Alternative 1	Rehab and closure	0	0	0,00
Impacts on wetlands	Alternative 1	Rehab and closure	0	0	0,00
Surface water pollution or contamination	Alternative 1	Rehab and closure	0	0	0,00

9.3.5 PRELIMINARY IMPACTS ON SOILS AND GEOLOGY

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.

- Potential risk of subsidence
- Loss/ Disturbance of Topsoil (including contamination, erosion and compaction); and
- Depletion of a mineral resource.

Table 33: Impacts on Soils and Geology

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 3	Construction	-16,25	-15	-15,00
Depletion of a mineral resource	Alternative 3	Construction	-18,75	-13	-13,00
Loss/ Disturbance of Topsoil (including contamination,	Alternative 3	Operation	-18,75	-14	-14,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
erosion and compaction)					
Depletion of a mineral resource	Alternative 3	Operation	-17	-16	-16,00
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 3	Decommissioning	-17,5	-13	-13,00
Depletion of a mineral resource	Alternative 3	Decommissioning	-17,5	-13	-13,00
Potential Risk of subsidence	Alternative 3	Construction	-8,25	-4,5	-4,50
Potential Risk of subsidence	Alternative 3	Operation	-8,25	-4,5	-4,50
Potential Risk of subsidence	Alternative 3	Decommissioning	-8,25	-4,5	-4,50
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 2	Construction	-17,5	-15	-15,00
Depletion of a mineral resource	Alternative 2	Construction	-17,5	-13	-13,00
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 2	Operation	-18,75	-14	-14,00
Depletion of a mineral resource	Alternative 2	Operation	-22,5	-22,5	-22,50
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 2	Decommissioning	-17,5	-13	-13,00
Depletion of a mineral resource	Alternative 2	Decommissioning	-17,5	-13	-13,00
Potential Risk of subsidence	Alternative 2	Construction	-13	-8,25	-8,25

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Potential Risk of subsidence	Alternative 2	Operation	-13	-8,25	-8,25
Potential Risk of subsidence	Alternative 2	Decommissioning	-13	-8,25	-8,25
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 1	Construction	0	0	0,00
Depletion of a mineral resource	Alternative 1	Construction	0	0	0,00
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 1	Operation	0	0	0,00
Depletion of a mineral resource	Alternative 1	Operation	0	0	0,00
Loss/ Disturbance of Topsoil (including contamination, erosion and compaction)	Alternative 1	Decommissioning	0	0	0,00
Depletion of a mineral resource	Alternative 1	Decommissioning	0	0	0,00
Potential Risk of subsidence	Alternative 1	Construction	0	-2	-2,00
Potential Risk of subsidence	Alternative 1	Operation	0	-2	-2,00
Potential Risk of subsidence	Alternative 1	Decommissioning	0	-2	-2,00

9.3.6 PRELIMINARY IMPACTS ON AIR QUALITY

The potential impacts on air quality to be investigated further are dust. Forzando have been undertaking a dust monitoring programme within the existing coal mine areas and it is anticipated that this monitoring will be extended to the Kalabasfontein project area.

- Gaseous and particulate emissions (fugitive dust); and
- Generation of PM2.5 and PM10.

Table 34: Preliminary Impacts on Air Quality

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Gaseous and particulate	Alternative 3	Construction	-16	-11	-11,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
emissions; fugitive dust					
Generation of PM2.5 and PM10	Alternative 3	Construction	-16	-11	-11,00
Gaseous and particulate emissions; fugitive dust	Alternative 3	Operation	-16	-12	-12,00
Generation of PM2.5 and PM10	Alternative 3	Operation	-16	-13	-13,00
Gaseous and particulate emissions; fugitive dust	Alternative 3	Decommissioning	-14	-12	-12,00
Generation of PM2.5 and PM10	Alternative 3	Decommissioning	-14	-12	-12,00
Gaseous and particulate emissions; fugitive dust	Alternative 2	Construction	-16	-12	-12,00
Generation of PM2.5 and PM10	Alternative 2	Construction	-16	-12	-12,00
Gaseous and particulate emissions; fugitive dust	Alternative 2	Operation	-20	-13	-13,00
Generation of PM2.5 and PM10	Alternative 2	Operation	-20	-15	-15,00
Gaseous and particulate emissions; fugitive dust	Alternative 2	Decommissioning	-17,5	-13	-13,00
Generation of PM2.5 and PM10	Alternative 2	Decommissioning	-17,5	-13	-13,00
Gaseous and particulate emissions; fugitive dust	Alternative 1	Construction	0	0	0,00
Generation of PM2.5 and PM10	Alternative 1	Construction	0	0	0,00
Gaseous and particulate emissions; fugitive dust	Alternative 1	Operation	0	0	0,00
Generation of PM2.5 and PM10	Alternative 1	Operation	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Gaseous and particulate emissions; fugitive dust	Alternative 1	Decommissioning	0	0	0,00
Generation of PM2.5 and PM10	Alternative 1	Decommissioning	0	0	0,00

9.3.7 PRELIMINARY VISUAL IMPACTS

Considering that the majority of the mining activities will take place underground it is anticipated that the impact of the surrounding visual receptors (if any) will be minimal.

- Alteration of natural topography;
- Sense of place; and
- Surface subsidence.

Table 35: Preliminary Visual Impacts

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Alteration of natural topography	Alternative 3	Construction	-7,5	-4,5	-4,50
Sense of place	Alternative 3	Construction	-7,5	-4,5	-4,50
Surface subsidence	Alternative 3	Construction	-7,5	-4,5	-4,50
Alteration of natural topography	Alternative 3	Operation	-7,5	-4,5	-4,50
Sense of place	Alternative 3	Operation	-7,5	-4,5	-4,50
Surface subsidence	Alternative 3	Operation	-7,5	-4,5	-4,50
Alteration of natural topography	Alternative 3	Decommissioning	-6,75	-4,5	-4,50
Sense of place	Alternative 3	Decommissioning	-6,75	-4,5	-4,50
Surface subsidence	Alternative 3	Decommissioning	-6,75	-4,5	-4,50
Alteration of natural topography	Alternative 3	Rehab and closure	-6,75	-4,5	-4,50
Sense of place	Alternative 3	Rehab and closure	-6,75	-4,5	-4,50
Surface subsidence	Alternative 3	Rehab and closure	-6,75	-4,5	-4,50
Alteration of natural topography	Alternative 2	Construction	-7,5	-5	-5,00
Sense of place	Alternative 2	Construction	-7,5	-5	-5,00
Surface subsidence	Alternative 2	Construction	-7,5	-5	-5,00
Alteration of natural topography	Alternative 2	Operation	-7,5	-5	-5,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Sense of place	Alternative 2	Operation	-7,5	-5	-5,00
Surface subsidence	Alternative 2	Operation	-7,5	-5	-5,00
Alteration of natural topography	Alternative 2	Decommissioning	-6,75	-4,5	-4,50
Sense of place	Alternative 2	Decommissioning	-6,75	-4,5	-4,50
Surface subsidence	Alternative 2	Decommissioning	-6,75	-4,5	-4,50
Alteration of natural topography	Alternative 2	Rehab and closure	-6,75	-4,5	-4,50
Sense of place	Alternative 2	Rehab and closure	-6,75	-4,5	-4,50
Surface subsidence	Alternative 2	Rehab and closure	-6,75	-4,5	-4,50
Alteration of natural topography	Alternative 1	Construction	0	0	0,00
Sense of place	Alternative 1	Construction	0	0	0,00
Surface subsidence	Alternative 1	Construction		0	0,00
Alteration of natural topography	Alternative 1	Operation	0	0	0,00
Sense of place	Alternative 1	Operation	0	0	0,00
Surface subsidence	Alternative 1	Operation		0	0,00
Alteration of natural topography	Alternative 1	Decommissioning	0	0	0,00
Sense of place	Alternative 1	Decommissioning	0	0	0,00
Surface subsidence	Alternative 1	Decommissioning		0	0,00
Alteration of natural topography	Alternative 1	Rehab and closure	0	0	0,00
Sense of place	Alternative 1	Rehab and closure	0	0	0,00
Surface subsidence	Alternative 1	Rehab and closure	0	0	0,00

9.3.8 PRELIMINARY VIBRATION AND BLASTING IMPACTS

The potential impacts investigated due to blasting operations are ground vibration, air blast and fly rock. There are no densely populated areas within close proximity to the proposed mining areas and as such, this impact is considered to be adequately managed through the mines current blasting controls.

- Displacement of Faunal Species due to noise and vibrations;
- Damage to property and infrastructure due to blasting; and
- Safety risk as a result of fly rock.

Table 36: Preliminary blasting and vibration impacts

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Displacement of Faunal Species due to noise and vibrations	Alternative 3	Construction	-7,5	-4,5	-4,50
Damage to property and infrastructure due to blasting	Alternative 3	Construction	-7,5	-4,5	-4,50
Safety risk as a result of fly rock	Alternative 3	Construction	-7,5	-4,5	-4,50
Displacement of Faunal Species due to noise and vibrations	Alternative 3	Operation	-7,5	-4,5	-4,50
Damage to property and infrastructure due to blasting	Alternative 3	Operation	-7,5	-4,5	-4,50
Safety risk as a result of fly rock	Alternative 3	Operation	-7,5	-4,5	-4,50
Displacement of Faunal Species due to noise and vibrations	Alternative 3	Decommissioning	-6,75	-4,5	-4,50
Damage to property and infrastructure due to blasting	Alternative 3	Decommissioning	-6,75	-4,5	-4,50
Safety risk as a result of fly rock	Alternative 3	Decommissioning	-6,75	-4,5	-4,50
Displacement of Faunal Species due to noise and vibrations	Alternative 2	Construction	-7,5	-5	-5,00
Damage to property and infrastructure due to blasting	Alternative 2	Construction	-7,5	-5	-5,00
Safety risk as a result of fly rock	Alternative 2	Construction	-7,5	-5	-5,00
Displacement of Faunal Species due to noise and vibrations	Alternative 2	Operation	-7,5	-5	-5,00
Damage to property and infrastructure due to blasting	Alternative 2	Operation	-7,5	-5	-5,00
Safety risk as a result of fly rock	Alternative 2	Operation	-7,5	-5	-5,00
Displacement of Faunal Species due to noise and vibrations	Alternative 2	Decommissioning	-6,75	-4,5	-4,50
Damage to property and infrastructure due to blasting	Alternative 2	Decommissioning	-6,75	-4,5	-4,50
Safety risk as a result of fly rock	Alternative 2	Decommissioning	-6,75	-4,5	-4,50
Displacement of Faunal Species due to noise and vibrations	Alternative 1	Construction	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Damage to property and infrastructure due to blasting	Alternative 1	Construction	0	0	0,00
Safety risk as a result of fly rock	Alternative 1	Construction		0	0,00
Displacement of Faunal Species due to noise and vibrations	Alternative 1	Operation	0	0	0,00
Damage to property and infrastructure due to blasting	Alternative 1	Operation	0	0	0,00
Safety risk as a result of fly rock	Alternative 1	Operation		0	0,00
Displacement of Faunal Species due to noise and vibrations	Alternative 1	Decommissioning	0	0	0,00
Damage to property and infrastructure due to blasting	Alternative 1	Decommissioning	0	0	0,00
Safety risk as a result of fly rock	Alternative 1	Decommissioning		0	0,00

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.

- 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.);
- Perceptions and Expectations;
- Employment Opportunities;
- Inability of the community to capture economic benefits & managing expectation;
- Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock;
- Loss of agricultural resource;
- Increase traffic incidences due to additional haulage; and
- Increase in traffic on adjacent road network resulting in additional damage to the roads.

Table 37: Preliminary socio-economic Impacts

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Dust (health and nuisance impact)	Alternative 2	Construction	-17,5	-14	-14,00
Safety and Security (i.e. access to properties, theft, fire hazards, etc	Alternative 2	Construction	-17,5	-14	-14,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Damage/ Disruption of services (i.e. water, electricity)	Alternative 2	Construction	-17,5	-14	-14,00
Impact on Existing Infrastructure (i.e. roads, fences, etc.)	Alternative 2	Construction	-17,5	-14	-14,00
Perceptions and Expectations	Alternative 2	Construction	-17,5	-14	-14,00
Employment Opportunities	Alternative 2	Construction	17,5	14	14,00
Inability of the community to capture economic benefits & managing expectation	Alternative 2	Construction	-17,5	-14	-14,00
Loss of agricultural resource	Alternative 2	Construction	-17,5	-14	-14,00
Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	Alternative 2	Construction	-17,5	-14	-14,00
Increase in traffic on adjacent road network resulting in additional damage to the roads	Alternative 2	Construction	-17,5	-14	-14,00
Increase traffic incidences due to additional haulage	Alternative 2	Construction	-17,5	-14	-14,00
Dust (health and nuisance impact)	Alternative 2	Operation	-17,5	-14	-14,00
Safety and Security (i.e. access to properties, theft, fire hazards, etc	Alternative 2	Operation	-17,5	-14	-14,00
Damage/ Disruption of services (i.e. water, electricity)	Alternative 2	Operation	-17,5	-14	-14,00
Impact on Existing Infrastructure (i.e. roads, fences, etc.)	Alternative 2	Operation	-17,5	-14	-14,00
Perceptions and Expectations	Alternative 2	Operation	-17,5	-14	-14,00
Employment Opportunities	Alternative 2	Operation	17,5	14	14,00
Inability of the community to capture economic benefits & managing expectation	Alternative 2	Operation	-17,5	-14	-14,00
Loss of agricultural resource	Alternative 2	Operation	-17,5	-14	-14,00
Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	Alternative 2	Operation	-17,5	-14	-14,00
Increase in traffic on adjacent road network resulting in additional damage to the roads	Alternative 2	Operation	-17,5	-14	-14,00
Increase traffic incidences due to additional haulage	Alternative 2	Operation	-17,5	-14	-14,00
Dust (health and nuisance impact)	Alternative 3	Construction	-12	-4,5	-4,50
Safety and Security (i.e. access to properties, theft, fire hazards, etc	Alternative 3	Construction	-12	-4,5	-4,50

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Damage/ Disruption of services (i.e. water, electricity)	Alternative 3	Construction	-12	-4,5	-4,50
Impact on Existing Infrastructure (i.e. roads, fences, etc.)	Alternative 3	Construction	-12	-4,5	-4,50
Perceptions and Expectations	Alternative 3	Construction	-12	-4,5	-4,50
Employment Opportunities	Alternative 3	Construction	12	4,5	4,50
Inability of the community to capture economic benefits & managing expectation	Alternative 3	Construction	-12	-4,5	-4,50
Loss of agricultural resource	Alternative 3	Construction	-12	-4,5	-4,50
Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	Alternative 3	Construction	-12	-4,5	-4,50
Increase in traffic on adjacent road network resulting in additional damage to the roads	Alternative 3	Construction	-12	-4,5	-4,50
Increase traffic incidences due to additional haulage	Alternative 3	Construction	-12	-4,5	-4,50
Dust (health and nuisance impact)	Alternative 3	Operation	-12	-4,5	-4,50
Safety and Security (i.e. access to properties, theft, fire hazards, etc	Alternative 3	Operation	-12	-4,5	-4,50
Damage/ Disruption of services (i.e. water, electricity)	Alternative 3	Operation	-12	-4,5	-4,50
Impact on Existing Infrastructure (i.e. roads, fences, etc.)	Alternative 3	Operation	-12	-4,5	-4,50
Perceptions and Expectations	Alternative 3	Operation	-12	-4,5	-4,50
Employment Opportunities	Alternative 3	Operation	-12	-4,5	-4,50
Inability of the community to capture economic benefits & managing expectation	Alternative 3	Operation	-12	-4,5	-4,50
Loss of agricultural resource	Alternative 3	Operation	-12	-4,5	-4,50
Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	Alternative 3	Operation	-12	-4,5	-4,50
Increase in traffic on adjacent road network resulting in additional damage to the roads	Alternative 3	Operation	-12	-4,5	-4,50
Increase traffic incidences due to additional haulage	Alternative 3	Operation	-12	-4,5	-4,50
Dust (health and nuisance impact)	Alternative 1	Construction	0	0	0,00
Safety and Security (i.e. access to properties, theft, fire hazards, etc	Alternative 1	Construction	0	0	0,00

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Damage/ Disruption of services (i.e. water, electricity)	Alternative 1	Construction	0	0	0,00
Impact on Existing Infrastructure (i.e. roads, fences, etc.)	Alternative 1	Construction	0	0	0,00
Perceptions and Expectations	Alternative 1	Construction	0	0	0,00
Employment Opportunities	Alternative 1	Construction	0	0	0,00
Inability of the community to capture economic benefits & managing expectation	Alternative 1	Construction	0	0	0,00
Loss of agricultural resource	Alternative 1	Construction	0	0	0,00
Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	Alternative 1	Construction	0	0	0,00
Increase in traffic on adjacent road network resulting in additional damage to the roads	Alternative 1	Construction	0	0	0,00
Increase traffic incidences due to additional haulage	Alternative 1	Construction	0	0	0,00
Dust (health and nuisance impact)	Alternative 1	Operation	0	0	0,00
Safety and Security (i.e. access to properties, theft, fire hazards, etc	Alternative 1	Operation	0	0	0,00
Damage/ Disruption of services (i.e. water, electricity)	Alternative 1	Operation	0	0	0,00
Impact on Existing Infrastructure (i.e. roads, fences, etc.)	Alternative 1	Operation	0	0	0,00
Perceptions and Expectations	Alternative 1	Operation	0	0	0,00
Employment Opportunities	Alternative 1	Operation	0	0	0,00
Inability of the community to capture economic benefits & managing expectation	Alternative 1	Operation	0	0	0,00
Loss of agricultural resource	Alternative 1	Operation	0	0	0,00
Damage to property and infrastructure due to blasting, as well as safety as a result of fly rock	Alternative 1	Operation	0	0	0,00
Increase in traffic on adjacent road network resulting in additional damage to the roads	Alternative 1	Operation	0	0	0,00
Increase traffic incidences due to additional haulage	Alternative 1	Operation	0	0	0,00

9.3.10 POTENTIAL CUMULATIVE IMPACTS

Without proper mitigation measures and continual environmental management, most of the identified impacts identified above may potentially become cumulative, affecting areas outside of their originally identified zone

of impact. The following is a list of some of the key potential impacts that may result in a significant cumulative impact as a result of the project. It must be stated that the list is not exhaustive and will be investigated further during the EIA phase and in consultation with stakeholders.

- Contribution to losses of potentially productive agricultural land, along with a reduction in land capability as a result of site sterilisation due to mining activities;
- Contribution to air quality impacts, specifically relating to increased suspended particulate matter (dust);
- Contribution to reduction in surface water quality;
- Increase in traffic;
- Disturbance of fauna;
- Invasion of alien plant species;
- Increase in ambient noise levels and potential adverse effect of noise sensitive receptors;
- Disturbance, damage or destruction of heritage features;
- Increased vulnerability and community safety-related risks and impacts; and
- Localised areas of acid mine drainage and groundwater contamination.

Table 38: Preliminary cumulative impacts

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Contribution to losses of potentially productive agricultural land	Alternative 2	Rehab and closure	-5,5	-4,5	-5,25
Air quality impacts	Alternative 2	Rehab and closure	-5,5	-5	-5,83
Reduction in surface water quality	Alternative 2	Rehab and closure	-5,5	-5	-5,83
Increase in traffic	Alternative 2	Rehab and closure	-5,5	-4,5	-5,25
Disturbance of fauna	Alternative 2	Rehab and closure	-5,5	-4,5	-5,25
Invasion of alien plant species	Alternative 2	Rehab and closure	-5	-4,5	-5,25
Noise	Alternative 2	Rehab and closure	-5	-4,5	-5,25
Disturbance, damage or destruction of heritage features	Alternative 2	Rehab and closure	-5,5	-4,5	-5,25
Increased vulnerability and community safety-related risks and impacts	Alternative 2	Rehab and closure	-5	-4,5	-5,25

Impact	Alternative	Phase	Pre-mitigation ER	Post-mitigation ER	Final score
Localised areas of acid mine drainage and groundwater contamination	Alternative 2	Rehab and closure	-8,25	-7,5	-8,75
Contribution to losses of potentially productive agricultural land	Alternative 3	Rehab and closure	-5,5	-4,5	-5,25
Air quality impacts	Alternative 3	Rehab and closure	-5,5	-4,5	-5,25
Reduction in surface water quality	Alternative 3	Rehab and closure	-5,5	-4,5	-5,25
Increase in traffic	Alternative 3	Rehab and closure	-5	-5	-5,83
Disturbance of fauna	Alternative 3	Rehab and closure	-5	-4,5	-5,25
Invasion of alien plant species	Alternative 3	Rehab and closure	-5	-4,5	-5,25
Noise	Alternative 3	Rehab and closure	-5	-4,5	-5,25
Disturbance, damage or destruction of heritage features	Alternative 3	Rehab and closure	-5	-4,5	-5,25
Increased vulnerability and community safety-related risks and impacts	Alternative 3	Rehab and closure	-5	-4,5	-5,25
Localised areas of acid mine drainage and groundwater contamination	Alternative 3	Rehab and closure	-5,5	-5	-5,83

9.3.11 POTENTIAL FOR ACID MINE DRAINAGE

Acid Mine Drainage (AMD) can be defined as the outflow or seepage of acidic water from old metal or coal mine areas. AMD is comprised of a low pH, iron and sulphate water and it usually occurs when water is exposed to the atmosphere via outflow or seepage, thus oxidising. The assessment of potential for acid mine drainage is based on findings of the EIA Report compile by GCS (Pty) Ltd (GCS) for Forzando Coal Mines in 2010.

The oxidation of the pyrite present in the coal seam and the roof and the floor of the underground mine workings will lead to the formation of acid mine drainage (AMD) and an increase in total dissolved solids (TDS) as the acidification is countered by the neutralising potential of the local geology. As detailed in the EIAR, the ABA

results indicate that the floor and roof material could leach contaminants. It is anticipated that flooding of the back areas will, however, continue until total flooding of the workings has occurred after closure. The significance of the impact during the operational phase will be low. The decommissioning will result in the potential generation of acid mine water within the mine workings, which will gradually reduce as oxidation of the pyrite is inhibited by the flooding. Owing to the general dip of the coal seam away from the sub-outcrop, flooding will occur progressively back from the deeper sections of the mined out area.

10 CLOSURE OBJECTIVES

The goals and objectives for closure are determined based on the baseline environment and the land uses that will be established post mining. The initial overarching closure objectives include the following:

- To ensure that as little water as possible seeps out of the various sections of the mine and where this is unavoidable, to ensure that the water is contained, if the volume is significant and if it does not meet the statutory water quality requirements;
- Make all areas safe for both humans and animals;
- Make all areas stable and sustainable;
- Any residue deposits must be stable in the long term to prevent erosion, subsidence or collapse. These facilities must also be closed in such a way that they do not continue to contribute to long term water quality problems from leachates which spread in an uncontrolled fashion;
- Remove all infrastructure other than the residue deposits/discard dumps and other waste disposal facilities unless alternative users can be found;
- Dispose of all rubble and waste at approved sites;
- Rehabilitate areas as soon as possible;
- Return rehabilitated land to the pre-mining environment where possible;
- Minimise the impact on the local and surrounding communities;
- Ensure that the areas mined by underground methods do not subside and that it will be safe to conduct normal activities above these workings by using appropriate safety factors and mine design; and
- Seal off all entries to the underground workings so that the water table will be restored thereby preventing the ingress of air and preventing spontaneous combustion of the pillars. Any access to the working will also be restricted in accordance with the MPRDA.

The above closure objectives will be revised during the EIA phase with specialist and public input.

11 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.

11.1 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 potentially feasible development alternatives. The feasible development alternatives are discussed below.

11.1.1 LAND USE ALTERNATIVES

The following process alternatives will be taken forward for consideration in the EIA phase:

- Mining; and
- Mixed Land Use (Mining and Agriculture).

11.1.2 MINING METHOD

The following process alternatives will be taken forward for consideration in the EIA phase:

- Bord and pillar mining.

11.1.3 TECHNOLOGY ALTERNATIVES

The following technology alternatives will be taken forward for consideration in the EIA phase:

- 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.
- Technology Alternative T2a – Rail: This option would involve transport of the coal by rail utilizing the existing railway siding.
- Technology Alternative T2a - Use of conveyor: This option would involve transport of the coal by conveyor to the buyer. There is an existing coal conveyor network within close proximity to the mine. This is the alternative currently used to transport the coal.

11.1.4 ACTIVITY ALTERNATIVES

Both the mining option (Alternative A1) and the no-go option (Alternative A2) will be assessed in the EIA phase.

11.1.5 LOCATION/LAYOUT/DESIGN ALTERNATIVES

The following location, layout or design alternatives will be taken forward for consideration in the EIA phase:

- The proposed mining area (Portions 7,8, RE, 11 and 13 of the farm Kalabasfontein 232 IS) under which the current Prospecting Rights 1035 PR and 1170 PR are held, will be assessed as the only feasible location alternative. Portion 7 and Portion 22 of the farm Uitgedacht 229 IS, the alternative locations where the proposed ventilation shaft will be located will also be assessed.

11.2 DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The following aspects may be assessed further assessed during the EIA phase investigations. It must however be noted that the need for all of the specialist studies that have been indicated below and that are discussed in this section, are dependent on the outcome of the Rock Engineering Report and this will be confirmed during the EIA phase of the project.

- Air Quality and Climate Change Impact Study;
- Wetland Study;
- Heritage and Palaeontology;
- Hydrogeology;
- Hydrology;
- Noise Study;

- Ecology;
- Social Impact Study;
- Soils, Land Use and Capability / Agricultural Impact Study;
- Visual Impact Assessment;
- Blasting and Vibrations Study; and
- Closure Plan and Quantum Update

11.3 ASPECTS TO BE ASSESSED BY SPECIALISTS

Outlined below is details of the various aspects of the project to be addressed in the EIA through detailed specialist studies. This also includes a proposed Scope of Work (SoW) / Terms of Reference (ToR) for each of the EIA specialist studies.

11.3.1 SPECIALIST STUDIES

11.3.1.1 HERITAGE RESOURCES

The EIA Phase Heritage Impact Assessment will consist of a fieldwork component and an assessment of the heritage resources identified within the site.

The fieldwork component will consist of a detailed walk through of the proposed mining area and is aimed at locating heritage resources falling within (and directly adjacent to) the proposed study area. The locations of all heritage resources that are recorded during the survey will be documented using a hand-held GPS. Furthermore, the documentation will reflect a brief qualitative description and statement of significance for each site and include a photographic record of all the sites.

It is important to also note that informal social consultation (i.e. with local community members, residents and knowledgeable individuals) will be undertaken during the fieldwork component. The aim of social consultation is to identify any tangible and intangible resources (i.e. sacred places, myths and indigenous knowledge resources) that may exist.

A report will be written which would include the following components:

- The identification and mapping of all heritage resources in the affected area;
- An assessment of the significance of such resources in terms of the heritage assessment criteria;
- An assessment of the impact of the development of such heritage resources;
- If heritage resources will be adversely affected by the proposed development, consideration of the alternatives;
- Proposed mitigation of any adverse effects during and after the completion of the proposed development.

11.3.1.2 SOCIO-ECONOMIC

11.3.1.2.1 SOCIAL

The EIA Phase Social Impact Assessment will consist of a fieldwork component and an assessment of the social resources identified within the site. In terms of the way forward, it is believed that a participatory approach is the best way to approach social impact assessment in the South African context. The World Bank Social Standards, Equator Principles and International Principles for Social Impact Assessment will be applied in the study. It must be noted that international standards and principles will be adapted to ensure that it can be applied in the local social context. Apart from obtaining environmental permits as required by law, any proposed

project would also require "social license to operate" from the community where it will be situated. This is seen to be a crucial element to ensure the successful implementation of any Environmental Management Plan (requested by law) resulting from the environmental studies. Social license to operate is also an important consideration in the compilation and execution of a Social and Labour Plan (SLP) required for all mining applications. Without the buy-in of the affected public, the chance of successful implementing these plans will be slim. The methodology proposed would therefore focus on involving the affected public in the research and planning where it is realistically possible and executable. Different methodologies will be utilised to ensure the affected communities are consulted in the way that is most appropriate to the community.

The following activities will form part of the process forward:

- Compilation of a baseline study that should include an in-depth literature review of the available literature. This should 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. This study should focus on the local, regional and provincial level. This has already been done for this report.
- Necessary demographic data should be obtained from Statistics South Africa and Municipal Integrated Development Plans. This has already been done for this report.
- A scoping exercise consisting of an initial site visit and information search will be conducted. Stakeholders will include town councils, tribal councils, landowners, the relevant farmer's associations, community representatives, forums and political leaders, amongst others.
- The initial site visit will be followed up with a longer period of fieldwork to obtain additional information and communicate with key stakeholders. Key stakeholders are likely to include:
    - Authorities: local municipality where in the project operates.
    - Affected parties: communities that will be affected by the project, farm labourers and farmers.
    - Interested parties: local business in the area, community-based organisations and non-governmental organisations within the affected communities, trade unions, and political groups.
- All public meetings arranged by the stakeholder engagement team should be attended by the social scientists.
- Information will be obtained via methods such as focus groups, formal and informal interviews, participatory rural appraisal, observation, the Internet and literature reviews. Field notes will be kept of all interviews and focus groups. Initial meetings have been conducted.
- An interview schedule might be utilised 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 SIA process will have a participatory focus. This implies that the SIA process will focus strongly on including the local community and key stakeholders.
- The public consultation process needs to feed into the SIA.
- Impacts will be rated according to significance (severity), probability, duration, spatial extent and stakeholder sensitivity.
- Where applicable, a distinction will be made between subjective and objective impacts.
- Information obtained through the public processes will inform the writing of the final SIA and associated documents.

11.3.1.2.2 ECONOMIC

The EIA Phase Economic Impact Assessment will consist of an assessment of the economic resources identified within the site. It will be prudent to investigate whether there may be any cumulative biophysical impacts on the surrounding land-use. It also needs to be stated that as part of the Environmental Approval Process for mining right applications in South Africa, an economic alternative land-use analysis is required. The requirement to effect this is outlined in the Department of Minerals and Resources' "Guideline For The Compilation Of An Environmental Impact Assessment And An Environmental Management Programme To Be Submitted With Applications For A Mining Right In Terms Of The Mineral And Petroleum Resources Development Act, 2002, (Act No. 28 Of 2002) (The Act)."

The following is required as stated in paragraph 9 of the DMR's impact assessment guidelines. "Provide, in listed format, the results of a specialist study, which study must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into a comparison of the costs and benefits of the alternative land uses with those of the mining operation on an equitable basis."

The methodology to be employed is to calculate all the socio-economic costs and benefits and deduct environmental rehabilitation costs, with the latter being multiplied by an acceptable factor to allow historic poor management of environmental rehabilitation by the mining industry as a whole (thus this is not specific to the Applicant's environmental responsibility profile.)

A qualitative assessment will be made on the important of the Applicant's development potential to the district.

11.3.1.3 SOILS, LAND USE AND LAND CAPABILITY

The EIA Phase Soils, Land Use, and Land Capability Impact Assessment will consist of a fieldwork component and an assessment of the soil resources identified within the site. The EIA and EMP phase of the project will involve a detailed survey (150 m x 150 m grid of observation) of the soils occurring, as well as their distribution. Samples of representative topsoil and subsoil horizons will be collected for analysis and the soils will be grouped into homogenous units, with the distribution shown on a map.

All relevant soil information and characteristics will be recorded, including agricultural potential, erodibility, natural drainage and effective depth. The latter is important in establishing the volume of useable (non-plinthic and non-gleyed) soil available for any stockpiling and rehabilitation purposes within each mapping unit, and cumulatively within the study area as a whole.

The pre-mining land capability of the surveyed soil mapping units will be determined by assessing the prevailing soil characteristics (depth, structure, texture, drainage, stoniness etc.), so that a detailed pre-mining land capability map can be produced.

At each soil observation point and in the immediate vicinity, the prevailing land use will also be noted and shown on a map.

The potential impacts will be assessed using the relevant methodology, so that their significance can be determined and appropriate mitigation measures suggested for implementation at each of the phases through planning, construction, operational and decommissioning phases.

The results of the detailed soil investigation will enable a soil management plan to be established and to be applied to the placement of infrastructure and supporting activities. This will establish the best methodology to ensure that no excess soil is lost or otherwise affected by mining operations and that soil removal, stockpiling and any subsequent rehabilitation can be carried out according to best practice technology.

11.3.1.4 FAUNA

The EIA Phase Fauna Impact Assessment will consist of a fieldwork component and an assessment of the faunal resources identified within the site. The following assessments should be undertaken during the EIA Phase in order to properly assess potential impacts on the ecological receiving environment by the proposed mine:

- The presence of species of concern or habitats that are important for particular species of concern must be evaluated during the EIA Phase. Particular attention should be paid to those species classified as threatened (VU, EN or CR), Near Threatened or Critically Rare and which have a high probability of occurring on site or being affected by the proposed infrastructure.

The following methodology is proposed in order to obtain the information required for assessing impacts on specific features of concern:

- General faunal survey with focus on terrestrial species and birds

11.3.1.5 FLORA

The EIA Phase Flora Impact Assessment will consist of a fieldwork component and an assessment of the floral resources identified within the site.

The vegetation communities were already delineated for the scoping report. This delineation will be refined during the EIA assessment, based on the detailed site visit results.

The site will be visited for a full vegetation assessment in the summer season, at least three weeks after the first large rainfall events. Sample sites will be plot-based and placed in each of the vegetation communities across the site. No plots will be placed in the plantations.

The primary and secondary vegetation will be sampled according to the Braun – Blanquet method, using cover abundance values to estimate plant abundance (Westhoff & Van der Maarel, 1978). The sample plots will not only be randomly placed, but also to record as many species on the site as possible and specifically threatened and protected species. Sample plots will be made large (approximately 30-50m^2) and kept inside the boundaries of vegetation communities. This ensures that more species are found.

The condition of the vegetation will be assessed and invasive plant species noted. A list of the identifiable species in each plot will be made and Cover Abundance (Werger, 1974) values associated with each species.

Flowering plants that could not be identified accurately will be sampled, pressed and/or photographed for identification. This information, if relevant to the authorities, will be made available once these species have been identified. Photographs will be taken of each sample site showing the condition of the vegetation and / or impacts prevalent on the site and a GPS point of the location of the plot taken.

The data is represented as maps showing natural and transformed vegetation, the natural vegetation is classified in terms of High, Moderate and Low sensitivity. This is represented along with the conservation importance given to the area by the Mpumalanga C-plan.

- No-Go: These areas are of such value to no development may take place in this system. This includes areas of primary vegetation, which is protected on a regional or national level as areas that is irreplaceable or areas that are incompatible with the proposed land use.
- High: Good vegetation cover exists, with no severe impacts noted and little problem plant or weed species, for instance a low percentage of plants associated with overgrazing and / or mechanical disturbance, as well as a healthy looking A-horizon (which means good organic content). No or slight management intervention or land use is required to return vegetation to pristine condition. Vegetation that is a good representation of a threatened vegetation type is also included in this category, even if a few alien and invasive species are present.
- Moderate: Signs of overgrazing, some shift in species composition, some degree of soil degradation. Management Intervention is required, but may also recover if natural processes occur and the impact is removed.
- Low: Extensive soil erosion, plant cover dominated by noxious and / or grazing resistant species. Somewhat diverted climax plant communities. Will not recover without serious management intervention. This also includes areas with very low plant species diversity such as cultivated pastures.

The vegetation is also classified according to the EIMS scoring system.

The report will include all the aspects required for vegetation assessments as indicated in above. The report will also include maps indicating the location of the vegetation community on site and the sensitivity of the communities, as well as the locations of threatened and / or protected plant species.

The impact assessment will take place according to the impact assessment methodology as received from EIMS. The impact assessment will be conducted on the potential impacts identified in this report. Appropriate mitigation measures will be recommended to keep the impacts as low as possible.

11.3.1.6 WETLAND STUDY

The EIA Phase Wetland Impact Assessment will consist of fieldwork components and assessments of the wetland and aquatic ecology resources identified within the site.

Following on from this initial desktop wetland delineation and wetland scoping report, a full, detailed wetland and aquatic ecology assessment will be undertaken for the EIA Phase of the project.

It is envisaged that field work will be undertaken towards the end of October/beginning November to allow the vegetation to respond to the first rains and ensure that full use can be made of vegetation indicators during the wetland delineation and assessment.

11.3.1.6.1 WETLAND ASSESSMENT

In addition to the delineation, the following aspects will also be assessed using standard, recognised methodologies:

- Functional assessment;
- Present ecological status (PES) assessment;
- Ecological importance and sensitivity (EIS) assessment.

A brief summary of the proposed approach is as follows:

Use will be made of 1:50 000 topographical maps, 1:10 000 orthophotos and Google Earth Imagery to create digital base maps of the study area onto which the wetland boundaries can be delineated using ArcMap 10.0. A desktop delineation of suspected wetland areas will be undertaken by identifying rivers and wetness signatures on the digital base maps. All identified areas suspected to be wetlands will then further investigated in the field.

Wetlands will be identified and delineated according to the delineation procedure as set out by the "A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas" document, as described by DWAF (2005) and Kotze and Marneweck (1999). Using this procedure, wetlands will be identified and delineated using the Terrain Unit Indicator, the Soil Form Indicator, the Soil Wetness Indicator and the Vegetation Indicator.

For the purposes of delineating the actual wetland boundaries use will be made of indirect indicators of prolonged saturation, namely wetland plants (hydrophytes) and wetland soils (hydromorphic soils), with particular emphasis on hydromorphic soils. It is important to note that under normal conditions hydromorphic soils must display signs of wetness (mottling and gleying) within 50cm of the soil surface for an area to be classified as a wetland (A practical field procedure for identification and delineation of wetlands and riparian areas, DWAF).

The delineated wetlands will then be classified using a hydro-geomorphic classification system based on the system proposed by Brinson (1993), and modified for use in South African conditions by Marneweck and Batchelor (2002) and SANBI (2009).

11.3.1.6.2 FUNCTIONAL ASSESSMENT

A functional assessment of the wetlands on site will be undertaken using the level 2 assessment as described in "Wet-EcoServices" (Kotze et al., 2007). This method provides a scoring system for establishing wetland ecosystem services. It enables one to make relative comparisons of systems based on a logical framework that measures the likelihood that a wetland is able to perform certain functions.

11.3.1.6.3 PRESENT ECOLOGICAL STATE AND ECOLOGICAL IMPORTANCE & SENSITIVITY

The Present Ecological State (PES) assessment will be undertaken using the Level 1 assessment described in the WET-Health manual (Macfarlane et al, 2009) for all hillslope seepage, pan and unchannelled valley bottom wetlands. For any channelled valley bottom wetlands and floodplain wetlands on site, the wetland IHI methodology described by Rountree (2007) will be applied.

Ecological Importance and Sensitivity (EIS) will be determined using the standard DWA methodology. This method rates the importance of wetlands based on three criteria, namely:

- Hydrological functioning and importance;
- Ecological importance (biodiversity maintenance);
- Direct human use benefits (social importance).

11.3.1.6.4 AQUATIC ECOLOGY ASSESSMENT

Biota will be sampled from watercourses upstream and downstream of proposed developments. In addition, endorheic pans will be sampled for specialised pan-adapted fauna.

- Aquatic macroinvertebrates will be collected using the SASS5 methodology as outlined in Dickens and Graham (2002). The SASS index is based on the presence or absence of families that are sensitive to changes in water quality. Hence, the absence of sensitive taxa indicates water quality impairment. Interpretation of the results will be modified to apply to standing water, where appropriate. Macroinvertebrates reflect overall changes in ecosystem health, including loss of diversity and abundance.
- Fish species differ in their relative tolerance towards changes in the environment. They react to both changes in their physical as well as their physico-chemical (water quality) habitats, and are therefore good indicators of environmental condition. Fish assemblages are therefore also widely used to monitor changes in the environment. Sampling method: All applicable non-destructive sampling methods will be applied to determine the fish species diversity of the study area. These may include electro-fishing, seine netting, cast-netting. The application of a fish index, such as the Fish Assemblage Integrity Index (FAII) or Fish Response Assessment Index (FRAI) may be used to determine the present biotic integrity of the aquatic ecosystems in the study area. Fish sampling will not be performed in the pans.
- Diatoms provide a rapid response to specific physico-chemical conditions in aquatic ecosystems and are often the first indication of change. The presence or absence of indicator taxa can be used to detect specific changes in environmental conditions such as eutrophication, organic enrichment, salinisation and changes in pH. Diatom indices are generated from a list of the taxa present in a sample, along with a measure of their abundances, according to the method outlined in Taylor et al. 2007.
- Water quality: in Situ analysis of pH, electrical conductivity, DO, TDS at all sites. It is envisaged that an additional approximately 10 samples will be sent away for major anions and cations analysis.

11.3.1.7 SURFACE WATER

The EIA Phase Surface Water Impact Assessment will consist of a fieldwork component and an assessment of the surface water resources identified within the site. Following on from this desktop surface water scoping report, a full, detailed surface water assessment will be undertaken for the EIA Phase of the project. A holistic approach will be followed, and an attempt will be made to link local hydrological, water quality and environmental studies to regional and national concerns, regulations and management strategies. The following activities are planned to finalise the input into the EIA/EMP.

11.3.1.7.1 STORM WATER MANAGEMENT PLAN OF THE KALABASFONTEIN PROJECT AREA (EXTENTION OF FORZANDO SOUTH)

A Storm Water Management Plan (SWMP) is a statutory requirement for mining and related activities in South Africa and is defined by General Notice 704 and Regulation 77 of the National Water Act (Act 36 of 1988). No

water use licenses in terms of this act will be granted without an approved SWMP. The purpose of a SWMP is to prevent the pollution of water resources in and around mining areas, or areas where mining related activity occurs.

Regulations define a methodological approach to preventing and/or containing pollution on mining sites, set design standards and specify measures that must be taken to monitor and evaluate the efficacy of pollution control measures that are implemented. The application of GN704 does, however extend beyond mining activities and for a large number of industrial developments water use license conditions stipulate a SWMP in terms of GN 704.

The storm water management plan will have the following deliverables:

- Determination of impact of all infrastructure on the Mean Annual Runoff;
- Determine the storm water flows and volumes (1:50 and 1:100 year events) for both clean and dirty water areas;
- Indicate the placement of berms, channels and pollution control dams on a map. Clean water diversion berms of the open cast areas will be developed to coincide with the mining plan to ensure the movement of these berms as mining progresses. A yearly plan for the movement of these berms will be provided;
- Conceptual designs for the proposed infrastructure;
- The dirty water storage requirements to prevent spillage of not more than once, on average in 50 years and to comply with GN704; and
- The storm water management plan will be according to the DWA BPG G1: Storm Water Management (DWA, 2006a).

11.3.1.7.2 WATER AND SALT BALANCE UPDATE FOR ALL FORZANDO COAL MINE OPERATIONS

Accurate water and salt balances are considered to be one of the most important and fundamental water management tools available to the mines. The purpose of water and salt balances includes (DWA, 2006b):

- Providing the necessary information that will assist in defining and driving water management strategies;
- Auditing and assessment of the water reticulation system, with the main focus on water usage and pollution sources. This includes identifying and quantifying points of high water consumption or wastage, as well as pollution sources. Seepage and leakage points can also be identified and quantified when the balances are used as an auditing and assessment tool;
- Assisting with the design of storage requirements and minimising the risk of spillage; and
- Assisting with the water management decision-making process by simulating and evaluating various water management strategies before implementation.

The water and salt balance will be determined using the standard DWA methodology (DWA, 2006b) and will have the following deliverables:

- A water process flow diagram;
- Development of Salt Balance using available water quality data; and
- Formatting of water balance into required DWA format.

11.3.1.8 MONITORING PLAN

Water monitoring is a legal requirement and can be used in negotiations with authorities for permits. The most relevant environmental management actions require data and thus the objectives of water monitoring include the following (DWA, 2006c):

- Generation of baseline/background data before mining commences;
- Identification of sources of pollution and extent of pollution (legal implications or liabilities associated with the risks of contamination moving off site);
- Monitoring of water usage by different users (control of cost and maximizing of water reuse); and
- Assessment of impact on receiving water environment.

The water monitoring programme will be developed using the standard DWA methodology (DWA, 2006b)) and will have the following deliverables:

- Water sample analyses baseline interpretation of results; and
- Developing of monitoring plan including sampling locations, elements to be analysed and sampling frequency.

The water monitoring programme will comply with the DWA BPG G3 (DWA, 2006c).

11.3.1.9 GROUND WATER

The EIA Phase Ground Water Impact Assessment will consist of a fieldwork component and an assessment of the ground water resources identified within the site. During the EIA Phase, Geochemical sampling and subsequent leach testing will need to be undertaken for the groundwater portion of the study:

Samples will be collected from diamond core drilling, these samples will be used to represent the overburden, coal seam, roof and floor material for the mining area. The potential for acid mine drainage will be tested through a leaching test of the material. The data acquired may then be utilized in acid based calculations for the site, as well as source concentrations input data for the contaminant transport model.

- Groundwater Numerical Modelling and Impact Assessment

A numerical groundwater flow and transport model will be constructed for the site, with a specific focus on the impacts to groundwater quality and quantity due to mining activities.

- Groundwater management plan

The numerical model results will help develop the groundwater management plan. Mitigation measures will be used here to minimize the potential impacts. The groundwater management plan will include suggested monitoring points to be added to the site together with recommendations on sampling procedure, frequency and the parameters to be assessed during monitoring.

11.3.1.10 AIR QUALITY

The EIA Phase Air Quality Impact Assessment will consist of a fieldwork component and an assessment of the air quality within the site. During the EIA Phase, the following research is required for the air quality portion of the study:

- Compilation of an emissions inventory, comprising the identification and quantification of potential sources of emissions due to the proposed mining operations;
- Dispersion simulations of ambient thoracic (PM10), respirable (PM2.5) particulate concentrations and dust fallout from all the operations at the mine for selected averaging periods;
- Evaluation of potential for human health and environmental impacts;
- Determination of environmental risk according to stipulated Impact Assessment methodology and,
- Recommendation of mitigation and management measures.

The modelling of air quality impacts requires information regarding the operation of the mine, including the number of blasting-holes drilled daily, the blast frequency, the stripping ratio of coal to overburden, the capacity of vehicles used for haulage and physical properties of the material transported. The identification and evaluation of impacts may be hampered should default values be applied, or assumptions made, during the

modelling process. Recent ambient air quality data from the vicinity, if available, will help verify the model projected air quality for baseline conditions.

11.3.1.11 VISUAL

The EIA Phase Visual Impact Assessment will consist of a fieldwork component and an assessment of the visual resources identified within the site.

During the EIA Phase, the following research is required for the visual portion of the study:

- Determine the visual intrusion: Photographic data (mine infrastructure and natural landscape) will be utilized together with digital manipulation to identify the highly sensitive viewing areas. This process allows for the development of a model that depicts the ability/ inability of the landscape to absorb the intrusion;
- Determine visibility and visual exposure: A viewshed analysis will be required for further analysis. A digital elevation model (roads, settlements) will be overlayed with contours lines to determine areas that may potentially view the mining site; and
- Describe the visual resource: The visual resource includes: landscape character, landscape quality and sense of place. These resources hold intrinsic values within the landscape, as a result these too receive a sensitivity value.

Mitigation measures and environmental management plan: Detailed mitigation measures will be developed/ designed to reduce the visual impact created by the mining activities.

11.3.1.12 NOISE

The EIA Phase Noise Impact Assessment will consist of a fieldwork component and an assessment of the noise sensitive receptors identified within the site.

During the EIA Phase, the following research is required for the noise portion of the study. The listed information below will be included to assist the EAP in the compilation of the Plan of Study (PoS) for the EIA:

- Data (location of equipment/activities, type of equipment/noise-generation activities, number of equipment or activities that simultaneously could generate noise) as received from the developer will be used to model the potential noise impact;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact;
- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations

11.3.1.13 AGRICULTURAL IMPACTS

During the EIA Phase, the following research is required for the agricultural impact study. The listed information below will be included to assist the EAP in the compilation of the Plan of Study (PoS) for the EIA:

- Data (location of equipment/activities, type of agricultural activities, number of equipment or activities that simultaneously could generate noise) as received from the developer will be used to model the potential noise impact;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact;

- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations.

11.3.1.14 CLIMATE CHANGE IMPACT STUDY

The proposed scope of work for the Climate Change Impact study will include the following:

- The GHG emissions during the construction, operation and decommissioning of the project will be compared to the global and national (if available) emission inventory; and compared to international benchmarks for the project;
- The robustness of the project with the impact of climate change over the lifetime of the project will be taken into account;
- The vulnerability of communities in the immediate vicinity of the project to climate change will be determined; and
- Proposed management and mitigation strategies will be provided.

11.3.1.15 BLASTING AND VIBRATIONS

The proposed scope of work for the blasting and vibrations study can be summarised as follows:

- Site Review and Information Capture;
- Modelling;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact;
- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations.

12 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 (base maps 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 39 below provides a breakdown of the sensitivity rating and weightings applied to determine the sensitivity score of each aspect. Table 39 provides a graphical illustration of the sensitivity mapping exercise applied to determine the overall environmental sensitivity within the study area.

Table 39: Sensitivity rating and weighting

Sensitivity Rating	Description	Weighting
Least concern	The inherent feature status and sensitivity is already degraded or contain no inherent sensitivities. 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 moderately 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

13 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.
- No specialist studies have been completed for the scoping phase of this application. 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.
- 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 mining area. 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).
- The levels of confidence for the impact assessment (Section 8.17) are considered low until detailed specialist studies are conducted 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.

14 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I 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:

15 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I 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 REFERENCES

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17 APPENDICES

17.1 APPENDIX 1: EAP CV

17.2 APPENDIX 2: PUBLIC PARTICIPATION INFORMATION

17.3 APPENDIX 3: COPY OF APPLICATION FORM

17.4 APPENDIX 4: IMPACT ASSESSMENT MATRIX

17.5 APPENDIX 5: PLANS